M990T, M990TL, M995T, M995TL

Treadmill

SERVICE MANUAL

This service manual is for use by Motus trained service providers only.

If you are not a Motus Trained Servicer, you must not attempt to service any Motus product.

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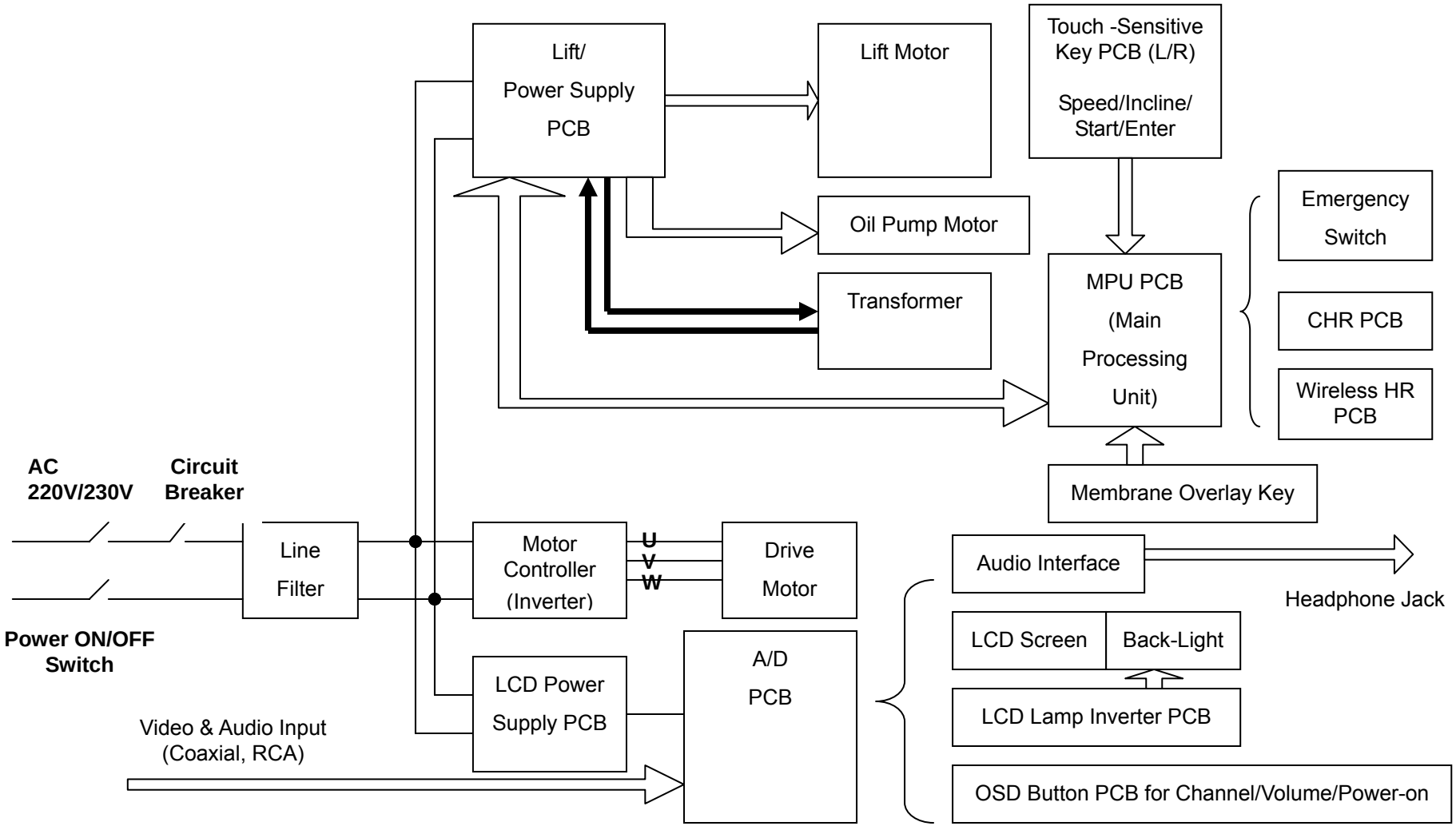
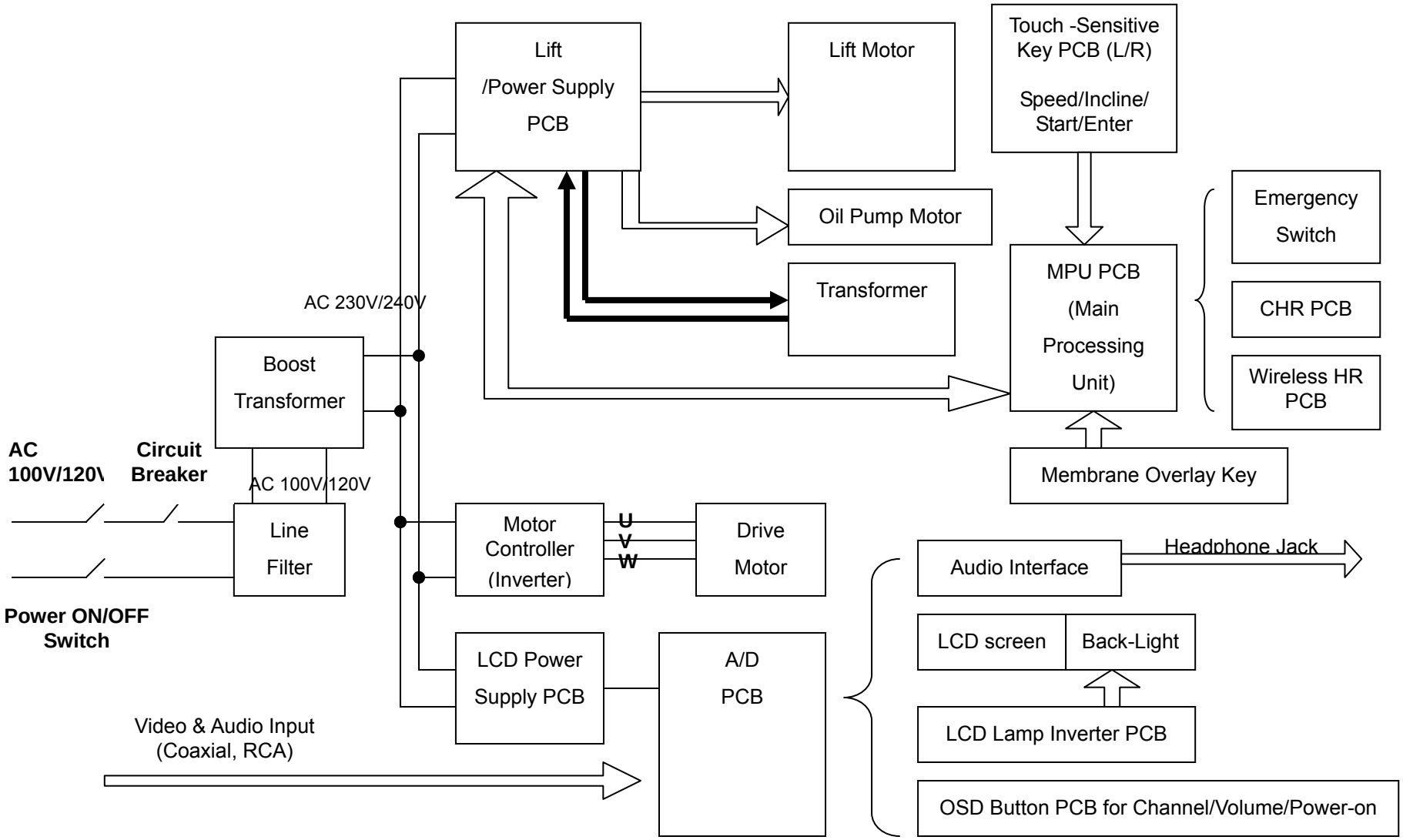
1.1 System Block Diagram

1) AC 220V/230V INPUT



2) AC 100V/120V INPUT (USA, Japan)



1.2 Troubleshooting Guide

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
No power to treadmill console	Line voltage is not present at treadmill.	Check the main circuit breaker and wall outlet voltage at the Facility. If wall outlet voltage is present, then replace line cord.
	Circuit breaker on the rear of the Treadmill Is tripped. (Countries using 220V or 230V Supply Voltage)	If tripped, a white button has popped out. Press the white button to reset the circuit breaker after eliminating the cause of the trip. The circuit breaker is located next to power ON/OFF switch on the outside of the treadmill.
	Power-on switch with built-in circuit breaker is tripped. (US/Canada market or Japan market using 100V or 120V Supply Voltage)	In the United States, Canada and Japan, circuit breaker is combined with power ON/OFF switch. If tripped, the switch is turned to OFF position. Turn the switch on after eliminating the cause of the trip. Replace it if necessary
	Power-on Switch is damaged.	Replace Power-on Switch if the output voltage of Power Switch is not present.
	Defective Line Filter.	Replace Line Filter if the output of Line Filter is not present.
	Electronic components of Lift/Power Supply PCB are damaged.	Disconnect CN3 cable at Lift/Power Supply PCB and then measure the voltage between pin 2 and pin 1. Measure the voltage between pin 2 and pin 3. The voltage should be 5VDC. If there is no voltage, replace the PCB.
	Fuses 1, 2 on Lift/Power Supply PCB are blown.	Replace Fuses or the PCB.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
No power to treadmill console	Defective wire harness	Disconnect **CN6** (3-pin connector) on MPU PCB (**M990T/M995T)** and then measure the voltage between pin 2 and pin 1 at the cable. Measure the voltage between pin 2 and pin 3 at the cable. If there is no voltage, replace the cable.
		Disconnect **CN1** (3-pin connector) on MPU (**M990TL/M995TL)** and then measure the voltage between pin 2 and pin 1 at the cable. Measure the voltage between pin 2 and pin 3 at the cable. If there is no voltage, replace the cable. If the cable is normal, secure the connector firmly.
	Defective MPU PCB	Replace MPU PCB.
Striding belt does not move or treadmill pauses randomly	Due to normal protective function. (E□□ is displayed on Console Display.)	**Refer to** **"Protective Function & Display Code"**
	Magnetic switch for emergency stop is not firmly attached.	Mount magnetic switch in position. If it is in position, adjust the position of magnetic sensor under properly or replace it if necessary.
	Emergency Push Button Switch is locked.	Unlock it by rotating clockwise.
	Insufficient power source	Plug treadmill into a dedicated 20-amp circuit.
	Unstable power connection.	Find unstable connection at electrical outlet and at treadmill
	RS485 connection for communication is loose.	If the Console display is normal, check the electrical connection between MPU of Console and Motor Controller under motor hood is firm.
	3-pin connectors at MPU of Display Console or Lift/Power Supply PCB are not secure.	Check the connection is secure.
SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION

Treadmill pauses Randomly and then Program Profile Window of Console start displaying from the beginning as if Power-on Switch is turned on.	Power-on switch is unstable or defective.	Replace power-on switch.
	Supply voltage to MPU PCB is too low.	If the voltage between pin 2 and pin 1 at CN1 on MPU PCB (**M990T/M995T)** is under 4.8V, replace Lift/Power Supply PCB.
		If the voltage between pin 2 and pin 1 at CN6 on MPU PCB (**M990T/M995T)** is under 4.8V, replace Lift/Power Supply PCB.
	Unstable cable connection.	Check the connection between CN3 on Lift/Power Supply PCB and CN1 **(M990TL/M995TL)** on MPU PCB is connected firmly.
		Check the connection between CN3 on Lift/Power Supply PCB and **CN6 (M990T/M995T)** on MPU PCB is connected firmly.
Maximum speed is reduced	The deck laminate worn through or the underside of striding belt became hard or glossy.	Replace belt and deck. (Refer to section “How to replace Striding Belt”, “How to replace Deck”)
	Manual lubrication is not sufficient.	Check if the lubrication is proper by pushing striding belt backward using your feet while holding front handlebar after turn OFF the treadmill. If insufficient, apply lubrication.
	Automatic lubrication system does not work.	Check if the lubrication is proper by pushing striding belt backward using your feet while holding front handlebar after turn OFF the treadmill. If insufficient, apply lubrication. Verify lubricant tank is not empty, or lubrication system works well.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Incline is not adjusted by Incline-Up or Incline-Down Button.	Touch-Sensitive Buttons does not work.	If all 3 lamps on Start/Stop, Speed Down and Speed UP do not light up, replace the Touch-Sensitive Key PCB.
		If a lamp on Start/Stop, Speed Down or Speed UP does not light up any more than before pressing each button, replace the Touch-Sensitive Key PCB.
	Unplugged or defective cables.	Check the connection between CN4 on Lift/Power Supply PCB and CN2 **(M990TL/M995TL)** on MPU PCB is exact or connected firmly.
		Check the connection between CN4 on Lift/Power Supply PCB and CN3 **(M990TL/M995TL)** on MPU PCB is exact or connected firmly.
	Unplugged or defective cable	Check the cable from the incline motor is connected firmly to CN20 on Lift/Power Supply PCB.
	Lift/Power Supply PCB is damaged.	Replace Lift/Power Supply PCB.
Speed is not adjusted by Speed-Up or Speed-Down Button.	Touch-Sensitive Buttons does not work.	If all 3 lamps on Start/Stop, Speed Down and Speed UP do not light up, replace the Touch-Sensitive Key PCB.
		If a lamp on Start/Stop, Speed Down or Speed UP does not light up any more than before pressing each button, replace the Touch-Sensitive Key PCB.
	Unplugged or defective cable	Check the cable from the Drive motor is connected firmly to the terminal of Motor Controller..
	RS485 connection for communication is loose.	If the Console display is normal, check the electrical connection between MPU of Console and Motor Controller under motor hood is firm.
	3-pin connectors at MPU of Display Console or Lift/Power Supply PCB are not secure.	Check the connection is secure.
	Motor Controller or MPU PCB is defective.	Replace Motor Controller or MPU PCB if necessary.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Treadmill changes Speed or Incline on its own.	Touch-Sensitive Key PCB is affected by some noise.	Replace the Touch-Sensitive Key PCB.
	Sweat or water over the buttons.	Remove sweat or water.
Treadmill shuts down on its own.	Touch-Sensitive Key PCB is affected by some noise.	Replace the Touch-Sensitive Key PCB.
	Sweat or water over the buttons.	Remove sweat or water.
Membrane Overlay Key is not responding when depressed.	Loose ribbon connection.	Verify the ribbon connection is firmly inserted into the corresponding socket of MPU PCB.
	Defective Membrane Overlay Key.	Replace Membrane Overlay Key.
	Defective MPU PCB.	Replace MPU PCB.
Oil leakage	Too much amount of lubrication.	Reduce the amount to be lubricated.
Striding belt drifts off center	Uneven floor surface	Level or balance treadmill. (Refer to section “Level Adjustment”)
	Striding belt tension or tracking adjustment is needed.	Align striding belt by using belt adjustment bolt after Level Adjustment is done. (Refer to section ”Striding belt alignment”)
	Worn striding belt.	Replace striding belt.
Striding belt slips during footfall.	Belt tension is loose.	Adjust the belt tension. (Refer to section ”Belt Tension adjustment”)
Loud groaning on footfall	High friction between deck and striding belt.	Lubrication is needed between deck and striding belt.
	Foreign objects.	Remove any debris or objects under striding belt.
Squeaking noise under motor hood	Drive Motor Belt may be worn or damaged.	Replace Drive Motor Belt.
	Drive Motor Belt tension is loose.	Adjust the tension.
	Foreign objects on the groove of the belt.	Remove any debris or objects on the groove of the belt.
Knocking sound from deck.	Deck is not fixed.	Tighten Deck by using the bolt to fix DECK.
Electrostatic discharge	The underside of Striding belt is worn away.	Replace the striding belt.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Heart rate reading is abnormally high or is displayed even when Chest Strap or Contact Heart Rate sensors are not in use.	Electromagnetic interference from television sets, cell phones, refrigerator, or motor driven exercise equipment.	Keep the treadmill away from the probable cause until the heart rate readings are accurate.
	RF energy source from another chest straps.	Keep another chest strap away more than 1 meter until the heart rate readings are accurate.
	Contact Heart Rate cables are pinched at handle bars.	Replace damaged cables.
Heart rate reading using wireless chest strap is erratic or not displayed	Chest strap electrodes are not wet enough to sense accurate heart rate.	Dampen the Chest strap electrodes with tap waters.
	The distance between cardio equipments are too close.	Maintain the distance more than 30 cm.
	Chest strap electrodes are out of monitoring range.	Make sure the chest strap is within 60cm from Wireless HR PCB.
	Chest strap battery is discharged.	Replace chest strap or the battery.
	Chest strap electrodes are not laid flat or horizontally across your skin.	Make sure the chest strap electrodes lies flat and horizontally across your skin.
	Faulty chest strap.	Replace chest strap.
	Faulty Wireless HR PCB.	Replace Wireless HR PCB.
	Defective cable or bad connection between Wireless HR PCB and MPU PCB.	Check the cable and connection is no problem.
Contact Heart Rate reading is erratic or not displayed.	Faulty CHR PCB.	Replace CHR PCB
	Dirty handlebar sensors.	Wipe stainless steel sensors with a clean soft cloth.
	Defective cable or bad connection between CHR PCB and MPU PCB.	Check the cable and connection is no problem
	User may have an unusual heart rate condition.	Let different user grasp sensors to detect any variances.

1.3 Troubleshooting Guide for LCD

Symptom/Condition		PROBABLE CAUSE	**CORRECTIVE ACTION**
Snow and noise are scattering on LCD screen. Any picture is not found even though channel-up button or channel-down button is pressed.		Air/cable setting is not correct	Follow the set up procedures in LCD manual.
		TV signal source is not supplied.	- Check if the TV signal source is correctly supplied to A/D PCB from external source. - Make sure the cable is properly secure. - If external TV signal is correct, try to connect the coaxial cable directly to the internal connector in AD PCB of Console to check whether the internal cables are wrong or not.
		75 ohm coaxial cable is bad.	Replace 75 ohm coaxial cable.
		A/D Board is damaged.	Replace A/D Board with new one.
LCD screen is uniformly white		Internal cable connection is loose or disconnected.	Check if the connection between LCD screen and A/D Board is tight.. In other word, LVDS cable shown in picture.
LCD screen is dark or black.	When LCD power is turned on by pressing TV on/off, "**VIDEO**", "**S-VIDEO**" or "**ANALOG**" appears temporarily and then disappears on the left upper corner of LCD screen.	TV mode is not set-up.	1) Whenever you press Volume down button, words are displayed in following order on the left upper corner of LCD screen. **"ANALOG"=>"VIDEO"=>"S-VIDEO"=>"TV"** 2) Press the button until "**TV**" is displayed. 3) As soon as "**TV**" is displayed, snow and noise will be scattering on LCD screen or any picture will be captured.
	When LCD power is turned on by pressing TV on/off, "**VIDEO**", "**S-VIDEO**" or "**ANALOG**" is **NOT** displayed on the left upper corner of LCD screen.	LCD Power Supply has a problem. Power Supply is used for supplying 12 VDC to LCD Overlay Bezel Assembly.	Check if LCD Power supply is normally operated or its LED lamp is turned on. If LED is off, ● replace Power Adapter. If LED is on,

			• tighten midpoint (LCD Power Supply side) & endpoint(A/D Board side) connection. • or make sure the voltage of end point is DC 12 volt.
		The cable related to LCD Lamp Inverter is loose in either side.	Check if the connection is secure.
		TV on/off button is wrong or stuck.	Replace OSD Button Board.
		A/D Board is damaged.	Replace A/D Board.
		LCD Lamp inverter is damaged.	Replace LCD Lamp inverter.
		LCD Back Light is damaged.	Replace LCD screen.
		The connector or cable is bad.	Replace the connector or cable
Channels or sound does not change		Button to change channels or sound does not work.	Replace the button, OSD Button Board or harness related to it.
No sound		Air/cable setting is not correct	Follow the set up procedures in LCD manual.
		Faulty headphones	Replace headphones
		Faulty headphone jack assembly.	Replace Audio Interface Board or headphone jack.

1.4 Protective Function & Display Code

If a treadmill stops suddenly, it means a protective function works properly. This is normal function to protect the treadmill. As the result of protective function, a code indicating the cause of error is displayed on the display console or the display panel of **Motor Controller** (or Motor Inverter) which is located under motor hood. Motor is driven directly by Motor Controller according to the command from the console.

If this protective function occurs, turn off the treadmill and then turn on the treadmill after 20 seconds even though the cause is eliminated. Even though the cause is eliminated, the treadmill stop due to protective function will remain unsolved if you turn on the treadmill within 20 seconds after turning off the treadmill.

Display Code	Protective Function Name	PROBABLE CAUSE or DESCRIPTION	CORRECTIVE ACTION
E04	Overcurrent	Excessive current flows in Motor Controller. In other word, the Motor Controller output current exceeds the rated current by more than approximately 180%. - The load is in abnormal condition like impact load.	- Reduce impact load or lubricate between belt and deck
		- A main circuit element is defective. - The output is short	- Replace Motor Controller with new one. - - Check the cables and wires between motor and Motor Controller are loose or if there is any short between wires.
		Overheated Motor Controller caused by worn or damaged belt and deck.	Replace the deck or belt.
E05	Overload	An excessive load is applied to motor, which is judged by detecting Motor Controller output current.	- Lubricate between belt and deck
E07	Overvoltage	Unexpected high voltage is detected at DC voltage of Motor Controller. - Input voltage of Motor Controller is too high.	- Check the input voltage fluctuates abnormally. - Don’t push the striding belt backward

		- Regenerative energy from motor is too much.	compulsorily by foot.
E60	Communication Error	- External noise - Trouble in internal memory due to or high temperature. - Cable connection between MPU and Motor Controller	- Replace Motor Controller cable with new one - Replace Motor Controller with new one
E09	Low voltage	Unexpected low voltage is detected at DC voltage of Motor Controller. - Input voltage of Motor Controller is too low. - Instantaneous power failure	- Check the input voltage to treadmill. - Connect the treadmill to dedicated circuit. - Supply stable power to treadmill
E34	Short-circuited output	Excessive current flows in Motor Controller when the output of Motor Controller is short	- Check the cables and wires between motor and Motor Controller are loose or if there is any short circuit between wires.
E08	EEPROM	Trouble in internal EEPROM due to high temperature. A lot of parameters are saved in the EEPROM.	- Make a service call.
E12	Tripped out due to external input signal	Failure caused intentionally by input terminal. It is not implemented in the treadmill.	Replace the Motor Controller
E14	Ground fault trip	Grounding protection when an Motor Controller output line dropped to earth. Current leaks from an output cable or the motor to ground.	- Check the cables and wires from Motor Controller are dropped to the earth
E21	Temperature trip	The temperature of power module in Motor Controller is too high.	- Ambient temperature is too high. - Do not place heat generating device near the treadmill.
		Overheated Motor Controller caused by worn or damaged belt and deck.	Replace the deck or belt.

1.5 Lubrication Guide

Basically, initial lubrication is performed at factory, but the oil could be dried during transportation or stock in your warehouse.

As soon as you complete installing, please lubricate and then make sure that oil is enough or not as below.

1) Turn off treadmill.

2) Push the striding belt backward using your feet while holding the front handle bar or side handle bar.

3) You can judge whether the friction is enough or not by feeling the smooth move of the belt. Lubrication is needed if the belt is not pushed well.

- Lubricant prevents the belt and deck from being damaged by frictional heat, which extends life span of the deck and belt.
- Use the lubricant provided by Motus only. **KF54** silicone fluid made from **Shin-Etsu Chemical Co. Ltd.**

How to manage automatic lubrication system (M990T, M990TL)

A certain amount of oil is lubricated automatically every lubrication interval which is preset at Manager Mode. Default lubrication amount and lubrication interval are set up to, for instance, 30cc and 500km, respectively, which can be set at Manager Mode. Therefore, it is recommended that fitness club manger set up the lubrication amount and interval according to club condition.

A volume of lubricant tank is about 270cc, and if residual amount of oil is less than 20%, the warning SYMBOL is displayed on the screen with a beep. At that time, fill the tank as instructions below.

1) Turn OFF the treadmill and open motor hood.

2) Open the cap of oil tank by turning it with hand.

3) Fill the empty tank fully with the oil provided by Motus. Keep in mind that automatic lubrication system doesn't work properly if oil is not filled full.

4) Close the cap of oil tank and put the motor hood in place.

5) Turn ON the treadmill. Message indicating oil lack will be still displayed on the screen with the beep.

6) To input "finishing oil-filling", press buttons in the order as below.

‘INCLINE ▽’ -> ‘INCLINE △’ -> ‘SPEED ▽’ -> ‘SPEED △’ -> ‘ENTER’

Keep in mind that this step must be done after filling the tank fully.

7) The warning SYMBOL and beep disappears.

How to inject lubricant manually (M995T, M995TL)

To judge proper lubrication timing, you can feel the friction intensity by pushing the striding belt backward using your feet while holding the front handle after turn OFF the treadmill.

1. Fill the lubricator with the oil Motus provided.
2. The conduction hole for the lubrication is at the right corner on the front of the treadmill as shown in the picture.
3. Insert the pipe tip of the lubricant to the end through the conduction hole to spread out the lubricant on the center of the belt.
4. Inject the lubricant into the conduction hole by squeezing the lubricator about 20 times under the belt speed of 4km.

The amount of 30 cc is recommended.

5. To spread out the lubricant all round on the belt, operate the treadmill for a few minutes.
6. Lubricate more than twice a month.

How to eliminate warning beep & symbol requiring lubrication (M995T, M995TL)

Although lubricant is not injected automatically, lubrication interval can be set up at Manager Mode, for instance, 500km**.** If the interval is too short or long, you can adjust the interval at Manager Mode. Warning beep & symbol every lubrication interval makes you easy to lubricate without any need to consider lubrication timing.

To reset the warning beep and symbol after completing manual lubrication, press buttons in the order as below.

‘INCLINE ▽’ -> ‘INCLINE △’ -> ‘SPEED ▽’ -> ‘SPEED △’ -> ‘ENTER’

The warning beep and SYMBOL disappear.

Numeric value 5 in management mode means interval of 500 km. If you exercise on treadmill at 8km/h for 10 hours a day, total distance a day is 80km and the warning beep and symbol appears every 6.25 days corresponding to 500 divided by 80.

The speed (8km/h) and workout duration for a day (10 hours) depend on the numbers of the users or utilization rate ay Gym.

SECTION II

HOW TO REPLACE & REPAIR GUIDE

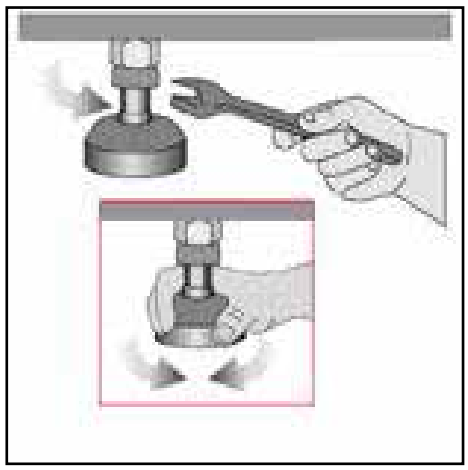
General

2.1 How to Stabilize the Treadmill
2.2 How to Align Striding Belt
2.3 How to Adjust Striding Belt Tension
2.4 How to Adjust Motor Drive Belt Tension
2.5 How to Replace the Rear Roller
2.6 How to Replace the Front Roller
2.7 How to Replace the Striding Belt
2.8 How to Replace the Motor Drive Belt
2.9 How to Replace the DECK
2.10 How to Replace Drive Motor
2.11 How to Replace the Incline Motor
2.12 How to Replace the Oil Pump
2.13 How to Replace the Contact Heart Rate Sensor

2.1 How to Stabilize the Treadmill

Two front casters and two adjustable rear feet (or stabilizing leg) support the weight of both the treadmill and a user exercising on it. The rocking motion or striding belt misalignment may be caused when one of them is not resting on the floor.

1) Check if the treadmill is even on a solid and flat surface. A BUBBLE LEVEL can be used to ensure proper leveling. Determine which foot is not resting on the floor.
2) Loosen the nut on the top of adjustable foot by turning it clockwise.
3) Once the nut is loosened, turn adjustable foot with hand until the rocking motion ceases.
4) After leveling, turn the nut counterclockwise and tighten it.



Note: Adjusting height must be done while rear side of treadmill is lifted up. Do not adjust more than 1/4 of entire adjustable rear foot's height.

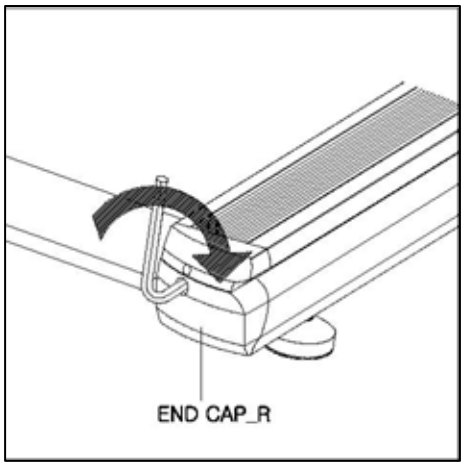
2.2 How to Align Striding Belt

The belt is properly aligned at the factory before shipment. However, while delivering or exercising, the belt can be misaligned from the original center position. The correct alignment or striding belt is critical to the smooth operation of the treadmill.

2.2.1 When the belt is off center to either right direction or left direction

1) Level and stabilize the treadmill prior to any alignments or tracking adjustments.
   * The belt may move off center by using the treadmill on uneven surface.
2) Turn on the treadmill and then check if the belt drifts off center or not while treadmill is operated with the speed of 5km/h for a few minutes.
3) Turn off the treadmill after keeping in mind whether the belt is off center to which direction, left or right.
4) Make sure the striding belt has completely stopped.

5) Find the right belt tensioning bolt in the rear end cap of the treadmill.
Make tracking adjustments using the 10 mm hex key wrench provided as shown.



- If the belt is off center to the right, turn the right adjusting bolt 1/4 turn clockwise, which brings the striding belt back to the left.
- If the belt is off center to the left, turn the right adjusting bolt 1/4 turn counterclockwise, which brings the striding belt back to the right.

Note: Do not turn the adjusting bolt more than 1/4 at a time. Over-tightening the bolt can damage the treadmill. Do not exceed one full turn of the adjusting bolts in either direction.

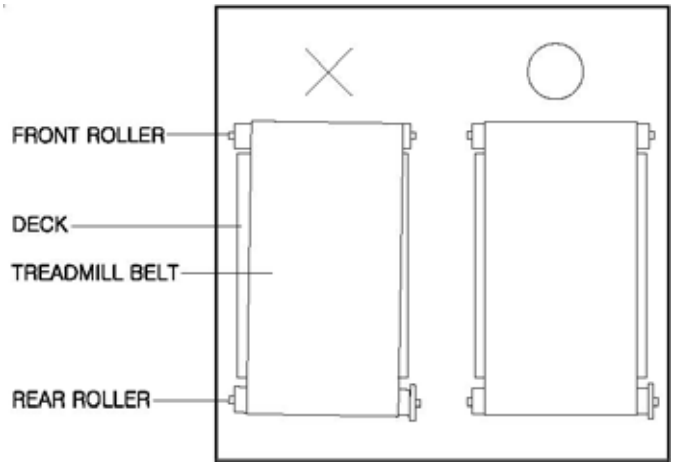
6) Turn ON the treadmill, press START/STOP, and then operate the treadmill with the speed of 5km/h.
7) Observe the striding belt for a few minutes. The belt should be centered on the deck.
8) If you need additional alignment, repeat step 2) through 7) of this procedure until the belt is properly aligned.

CAUTION: If you hear any chafing, the belt is not center-aligned or the belt appears to be

getting damaged, stop the treadmill and contact authorized local dealer.

2.2.2 When the belt is diagonally tilted

When the Striding Belt is diagonally tilted as shown, the Front Roller (F4) needs to be aligned by following steps.



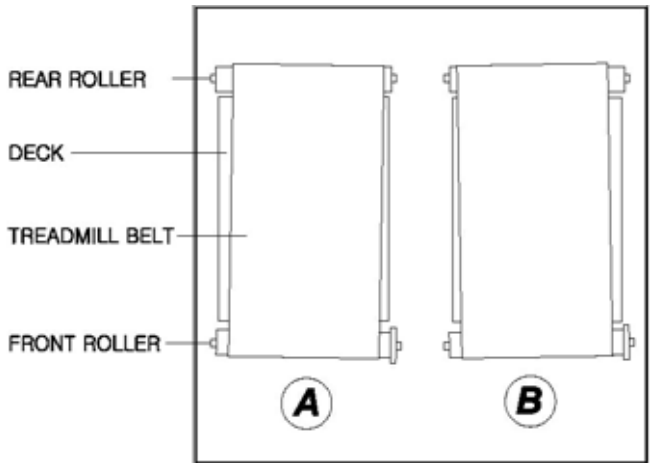
1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.

2) Remove three Motor Cover screws (B20) and then lift the cover (T1) out from between the upright Supports.

3) Turn the Hex Bolt (B2) in either direction to compensate for the tilted Striding Belt.

When the Striding Belt is tilted as shown in A), turn the Hex Bolt (B2) by 1/4 turn in the direction of (1).

When the Striding Belt is tilted as shown in B), turn the Hex Bolt (B2) by 1/4 turn in the direction of (2).

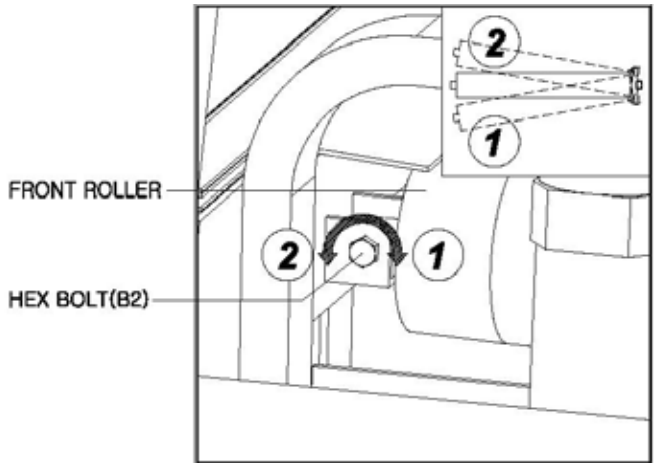


Note: Make adjustments in 1/4 turn.

The position of the Front Roller to be changed by the direction of the Hex Bolt (B2) is indicated in the figure.

4) Re-assemble the Motor Cover in the reverse order of removal and make sure that the Striding Belt is properly aligned after turning on the unit power and operating it with the speed of 5km/h for a few minutes..

5) Repeat this adjustment until the Striding Belt is properly aligned.



2.3 How to Adjust Striding Belt Tension

Belt tension is properly adjusted before delivery. However, while exercising for a long time, the tension can be loose. Belt tension is adjusted by moving the position of rear roller using the belt tensioning bolt of END CAP.

Note: it is very important to keep belt's tension constant to avoid belt slips during footfall for user's safety.

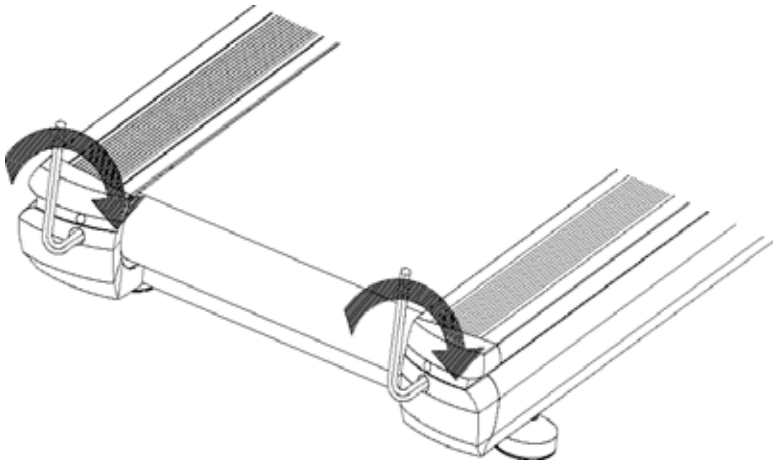
1) Turn on the treadmill, press START/STOP, and then operate the treadmill with the speed of 4km/h. Walk on the treadmill. Tightly grip the front handlebar and apply force with feet on the striding near the motor cover against the moving direction. If the belt slips, do steps from 2). If it does not slip, the tension is proper.

2) Stop the treadmill for a safety during adjustment and prepare 10mm wrench

Do not adjust tension while treadmill is in operation.

Warning: If you adjust the belt tension when the treadmill is in operation, it is very dangerous because sleeve or a part of body may be caught in roller or belt.

3) Locate the two belt tensioning bolts in the end caps on each rear side of the treadmill as shown, which enables to adjust belt tension. When turning this bolt, a position of roller moves back and forth. To move backward the roller, turn the bolts clockwise. To move forward the roller, turn the bolts counterclockwise.



4) Put 10mm wrench into the hole of the Right End Cap as shown and then turn the wrench 1/4 turn clockwise.

5) Put 10mm wrench into the hole of the Left End Cap as shown and then turn the wrench 1/4 turn clockwise. Equal amount of rotations should be performed on right tensioning bolt and left tensioning bolt. If not so, the belt is off center to either right direction or left direction.

6) Repeat steps 1) through 5) until the belt no longer slips.

Do not exceed one full turn of the adjusting bolts in either direction. Over-tightening of the bolts may over stretch and damage the striding belt or roller bearings.

If the belt continues to slip in spite of the belt tension adjustment, verify that Drive Motor Belt can be the cause of the slip.

2.4 How to Adjust Motor Drive Belt Tension

The tension of Motor Drive Belt (M3, Poly-V Belt) can be loosened by a long time use and it can cause a slip between The Drive Motor Pulley and Motor Drive Belt. The tension is corrected by adjusting the mounting position of the Drive Motor (M1).

Do the steps below while referring to the following Exploded Views in Appendix.

A.1 M990T

B.1 MAIN BODY_FRONT A

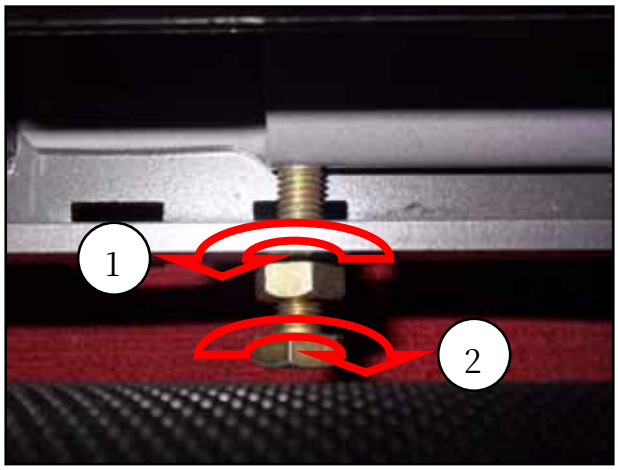
C.1 MAIN BODY_REAR

1) Stop the treadmill after lifting up the unit at maximum by operating Incline Motor.

2) Turn off the unit power at the switch at the state of the treadmill lifted-up and then unplug the line cord at wall outlet.

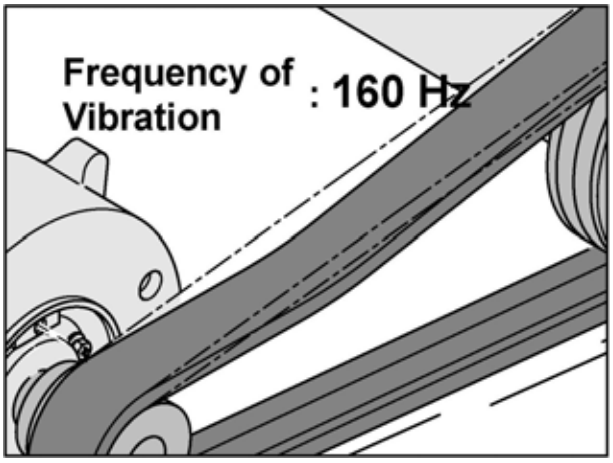
3) Remove three bolts (B20) and then lift Motor Cover (T1) out from between the upright Supports.

4) Loosen four nuts (N2) securing the Drive Motor (M1) by one or two turns to allow the Drive Motor to be moved by the Tension Bolt (B7).



5) Turn the nut (N3) in the direction of arrow ‘1” to allow adjusting the tension on the Drive Motor Belt by using the Tension Bolt (B7).

6) Turn the Tension Bolt (B7) in 1/4 turn in the direction of arrow ”2” to move the Drive Motor (M1) toward the outside of the unit, and then measure the tension of the Belt..



Note: One turn of the Tension Bolt makes the Drive Motor move by 1.5 mm. Keep in mind that tightening the Tension Bolt too much can damage the internal bearings of the Drive Motor or Front Roller.

7) When the tension reaches 160 Hz, secure two nuts (N2) diagonally.

Note: It is desirable to set the tension to 150Hz before tightening two nuts (N2)

because tightening two nuts (N2) increases the tension of the Motor Drive Belt.

8) Measure the Tension again. If the tension is lower than 155Hz or higher than 165Hz, re-adjust the tension 4 through 8) until it reaches 155Hz to 165Hz.

9) When the tension reaches 160 Hz, tighten the nut (N3) securing the Tension Bolt (B7).

10) Tighten remaining two nuts (N2) diagonally**.**

11) Make sure that the nut (N3) securing the Tension Bolt (B7) is tightened.

12) Re-assemble remaining parts in the reverse order of removal.

2.5 How to Replace the Rear Roller

Do the steps below while referring to the following Exploded Views in Appendix.

A.1 M990T

B.1 MAIN BODY_FRONT A

C.1 MAIN BODY_REAR

1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.

2) Remove three Motor Cover screws (B20) and then lift the cover(T1) out from between the upright Supports.

3) Remove one bolt (B18) inside the left End Cap on the rear side of the unit and then remove END CAP_L (F10) from the unit.

Remove one bolt (B18) inside the right End Cap on the rear side of the unit and then remove END CAP_R(F11) from the unit.

4) Pull out two NONSLIP_PVC (F9) toward the rear side of the unit, which are inserted into the left NONSLIP_TOP (F8) /NONSLIP SIDE_L(F6) and the right NONSLIP_TOP(F8)/NONSLIP SIDE_R (F7).

5) Remove eight bolts (B13) and then remove the left NONSLIP_TOP (F8) /NONSLIP SIDE_L(F6) and the right NONSLIP_TOP(F8)/NONSLIP SIDE_R(F7).

6) Remove two bolts (B1) and then remove REAR ROLLER (F5) out under the Striding Belt.

7) Install a new Rear Roller in the reverse order of disassembly.

8) Refer to “How to Align Striding Belt” and “How to Adjust Striding Belt Tension”.

2.6 How to Replace the Front Roller

Do the steps below while referring to the following Exploded Views in Appendix.

A.1 M990T

B.1 MAIN BODY_FRONT A

C.1 MAIN BODY_REAR

1) Stop the treadmill after lifting up the unit at maximum by operating Incline Motor.

2) Turn off the unit power at the switch at the state of the treadmill lifted-up and then unplug the line cord at wall outlet.

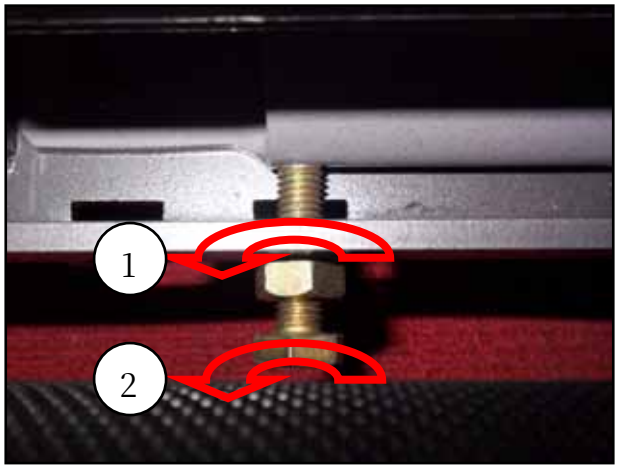
3) Remove three bolts (B20) and then lift Motor Cover(T1) out from between the upright Supports.

4) Remove one bolt (B18) inside the left End Cap on the rear side of the unit and then remove END CAP_L (F10) from the unit.

5) Remove one bolt (B18) inside the right End Cap on the rear side of the unit and then remove END CAP_R (F11) from the unit.

6) Loosen two bolts (B1) by turning it counterclockwise to slacken the Striding Belt enough to allow side-to-side movement of the FRONT ROLLER (F4).

Count the number of rotations when loosening the bolts (B1) for re-tensioning the Striding Belt.



7) Loosen the nut (N3) securing Tension Bolt (B7) for the Drive Motor Belt (M3) using spanner as shown in arrow mark 1.

9) Loosen the Tension Bolt (B7) for the Drive Motor Belt (M3) as indicated in arrow mark 2 to allow the movement of the Drive Motor (M1).

10) Loosen four nuts (N2) securing the Drive Motor (M1) by one or two turns to allow the Drive Motor to be moved by the Tension Bolt (B7).

11) Move the Drive Motor (M1) toward the FRONT ROLLER to slacken the Drive Motor

Belt (POLY-V BELT).

12) Remove two bolts (B16, B2) securing the FRONT ROLLER (F4) and then remove the FRONT ROLLER out from the left side of the frame, through the underside the Striding Belt. Remove the DRIVE BELT (M3) out and save for a new Front Roller.

13) Install the new Front Roller and the Drive Motor Belt into position and secure in place with the mounting bolt (B16, B2). Adjust the Front Roller to be in parallel with the Rear Roller and the Drive Motor by using the right side bolt (B2).

14) Make sure that the Motor Drive Belt (M3) is positioned on the grooves of the Front Roller Pulley and the grooves of the Drive Motor Pulley.

15) Adjust the Motor Drive Belt Tension while referring to “How to Adjust Motor Drive Belt Tension”.

16) Install the REAR ROLLER and other parts in the reverse order of disassembly.

17) Refer to “How to Align Striding Belt” and “How to Adjust Striding Belt tension”.

2.7 How to Replace the Striding Belt

Do the steps below while referring to the following Exploded Views in Appendix.

A.1 M990T

B.1 MAIN BODY_FRONT A

C.1 MAIN BODY_REAR

1) Stop the treadmill after lifting up the unit at maximum by operating Incline Motor.

2) Turn off the unit power at the switch at the state of the treadmill lifted-up and then unplug the line cord at wall outlet.

3) Remove three bolts (B20) and then lift Motor Cover (T1) out from between the upright Supports.

4) Remove one bolt (B18) inside the left End Cap on the rear side of the unit and then remove END CAP_L (F10) from the unit.

Remove one bolt (B18) inside the right End Cap on the rear side of the unit and then remove END CAP_R (F11) from the unit.

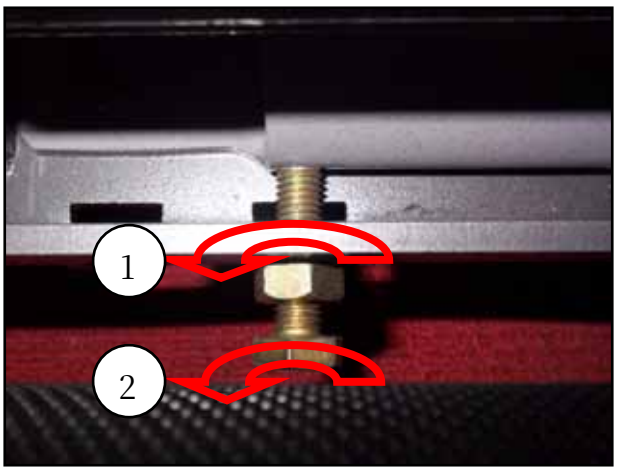
5) Pull out two NONSLIP_PVC (F9) toward the rear side of the unit, which are inserted into the left NONSLIP_TOP (F8)/NONSLIP SIDE_L (F6) and the right NONSLIP_TOP (F8)/NONSLIP SIDE_R (F7).

6) Remove eight bolts (B13) and then remove the left NONSLIP_TOP (F8)/NONSLIP SIDE_L (F6) and the right NONSLIP_TOP (F8)/NONSLIP SIDE_R (F7).

7) Remove two bolts (B1) and then remove REAR ROLLER (F5) out under the Striding Belt.

8) Loosen the nut (N3) securing Tension Bolt (B7) for the Drive Motor Belt (M3) using spanner as shown in arrow mark “1”.

9) Loosen the Tension Bolt (B7) for the Drive Motor Belt (M3) as indicated in arrow mark “2” to allow the movement of the Drive Motor (M1).



10) Loosen four nuts (N2) securing the Drive Motor (M1) by one or two turns to allow the Drive Motor to be moved by the Tension Bolt (B7).

11) Move the Drive Motor (M1) toward the FRONT ROLLER to slacken the Drive Motor Belt (POLY-V BELT).

12) Remove two bolts (B16, B2) securing the FRONT ROLLER (F4) and then remove the

FRONT ROLLER out from the left side of the frame, through the underside the Striding Belt. Remove the DRIVE BELT (M3) out and save for a new Front Roller.

13) Remove the eight mounting bolts (B13) and then remove the DECK (F2).

14) Position a new Striding Belt (F3) onto the center of the frame inside unit and then install the saved DECK (F2) by tightening the eight mounting bolts (B13).

15) Install the new Front Roller and the Drive Motor Belt into position and secure in place with the mounting bolt (B16, B2). Adjust the Front Roller to be in parallel with the Rear Roller and the Drive Motor by using the right side bolt (B2).

16) Make sure that the Motor Drive Belt (M3) is positioned on the grooves of the Front Roller Pulley and the grooves of the Drive Motor Pulley.

17) Adjust the Motor Drive Belt Tension while referring to “How to Adjust Motor Drive Belt Tension”.

18) Install the REAR ROLLER and other parts in the reverse order of disassembly.

19) Refer to “How to Align Striding Belt” and “How to Adjust Striding Belt tension”.

2.8 How to Replace the Motor Drive Belt

Do the steps below while referring to the following Exploded Views in Appendix.
A.1 M990T
B.1 MAIN BODY_FRONT A
C.1 MAIN BODY_REAR

1) Stop the treadmill after lifting up the unit at maximum by operating Incline Motor.
2) Turn off the unit power at the switch at the state of the treadmill lifted-up and then unplug the line cord at wall outlet.
3) Remove the three bolts (B20) and then lift Motor Cover (T1) out from between the upright Supports.
4) Remove one bolt (B18) inside the left End Cap on the rear side of the unit and then remove END CAP_L (F10) from the unit. Remove one bolt (B18) inside the right End Cap on the rear side of the unit and then remove END CAP_R (F11) from the unit.
5) Loosen two bolts (B1) by turning it counterclockwise to slacken the Striding Belt enough to allow side-to-side movement of the FRONT ROLLER (F4).
Count the number of rotations when loosening the bolts (B1) for re-tensioning the Striding Belt.
6) Loosen the nut (N3) securing Tension Bolt (B7) for the Drive Motor Belt (M3) using spanner.
7) Loosen the Tension Bolt (B7) for the Drive Motor Belt (M3, POLY-V BELT) to allow the movement of the Drive Motor (M1).
8) Loosen four nuts (N2) securing the Drive Motor (M1) by one or two turns to allow the Drive Motor to be moved by the Tension Bolt (B7).
9) Move the Drive Motor (M1) toward the FRONT ROLLER to slacken the Drive Motor Belt.
10) Remove two bolts (B16, B2) securing the FRONT ROLLER (F4) and then remove the FRONT ROLLER out from the left side of the frame, through the underside the Striding Belt. Remove the DRIVE BELT (M3) out and save for a new Front Roller.
11) Install the new Front Roller and the Drive Motor Belt into position and secure in place with the mounting bolt (B16, B2). Adjust the Front Roller to be in parallel with the Rear Roller and the Drive Motor by using the right side bolt (B2).
12) Make sure that the Motor Drive Belt (M3) is positioned on the grooves of the Front Roller Pulley and the grooves of the Drive Motor Pulley.
13) Adjust the Motor Drive Belt Tension while referring to “How to Adjust Motor Drive Belt Tension”
14) Install the REAR ROLLER and other parts in the reverse order of disassembly.
15) Refer to “How to Align Striding Belt” and “How to Adjust Striding Belt tension”.

2.9 How to Replace the DECK

Do the steps below while referring to the following Exploded Views in Appendix.

A.1 M990T

B.1 MAIN BODY_FRONT A

C.1 MAIN BODY_REAR

1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.

2) Remove three bolts (B20) and then lift Motor Cover (T1) out from between the upright Supports.

3) Remove one bolt (B18) inside the left End Cap on the rear side of the unit and then remove END CAP_L (F10) from the unit.

Remove one bolt (B18) inside the right End Cap on the rear side of the unit and then remove END CAP_R (F11) from the unit.

4) Pull out two NONSLIP_PVC (F9) toward the rear side of the unit, which are inserted into the left NONSLIP_TOP (F8)/NONSLIP SIDE_L (F6) and the right NONSLIP_TOP (F8)/NONSLIP SIDE_R (F7).

5) Remove eight bolts (B13) and then remove the left NONSLIP_TOP (F8)/NONSLIP SIDE_L (F6) and the right NONSLIP_TOP (F8)/NONSLIP SIDE_R (F7).

6) Remove two bolts (B1) and then remove the REAR ROLLER (F5) out under the Striding Belt.

7) Remove the eight mounting bolts (B13) and then remove the DECK (F2) out from under the Striding Belt.

8) Mount a new DECK (F2) through the Striding Belt and secure it in position by tightening the eight mounting bolts (B13).

10) Install the REAR ROLLER and other parts in the reverse order of disassembly.

11) Refer to “How to Align Striding Belt” and “How to Adjust Striding Belt tension”.

2.10 How to Replace Drive Motor

Do the steps below while referring to the following Exploded Views in Appendix.

A.1 M990T

B.1 MAIN BODY_FRONT A

C.1 MAIN BODY_REAR

1) Stop the treadmill after lifting up the unit at maximum by operating Incline Motor.

2) Turn off the unit power at the switch at the state of the treadmill lifted-up and then unplug the line cord at wall outlet.

3) Remove three bolts (B20) and then lift Motor Cover (T1) out from between the upright Supports.

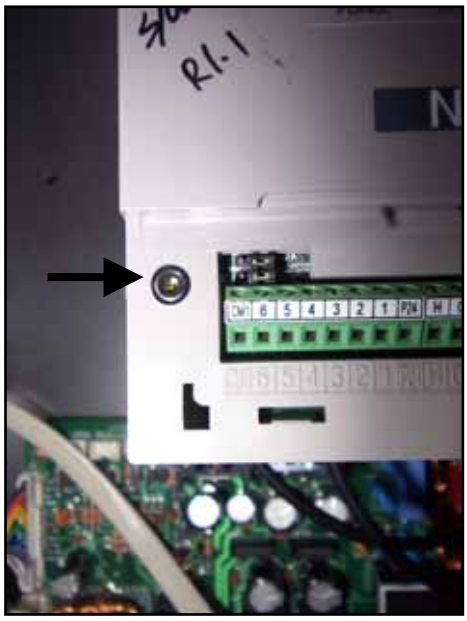
4) Remove the nut (N3) securing the Tension Bolt (B7) by using a spanner.

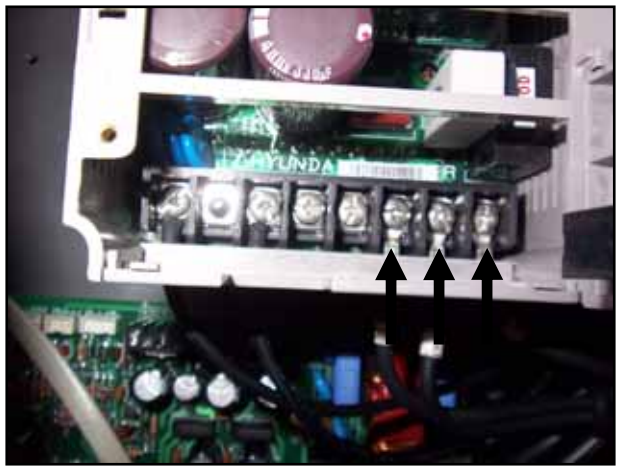
5) Remove the Tension Bolt (B7) to reserve a space to move the Drive Motor.

6) Remove the upper small Cover by pushing it in the direction of arrow while pushing it downward.

7) Remove the screw on the lower left side of the Motor Controller and then open the Cover.

8) Disconnect three Cables from the Motor Controller by removing three bolts securing three

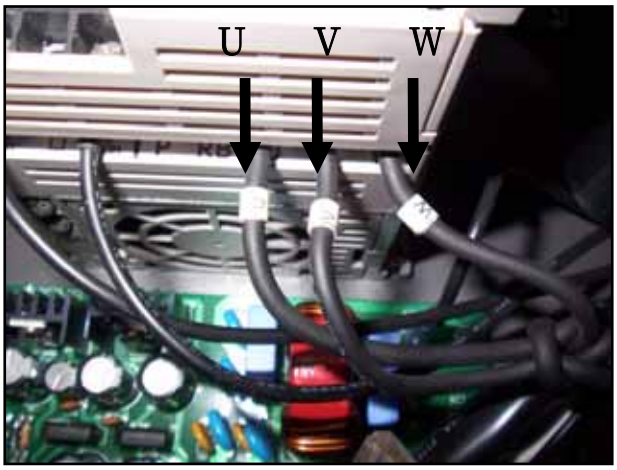




cables to the Motor Controller as shown. U, V or W is marked on three Cables.

9) Remove four bolts (B9), washers (W2) and four nuts (N2) and then lift the Drive Motor (M1) out.

10) Install a new Drive Motor in the reverse order of removal and then connect the three Cables from the Drive Motor to the Motor Controller. Keep in mind that each three cables should be connected exactly as shown. In other word, connect the Cable “W” to rightmost terminal, Cable “V” to second rightmost terminal and Cable “U” to third rightmost terminal.



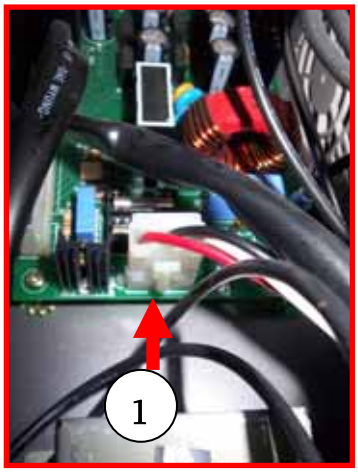
11) Re-install two Covers of the Motor Controller in the reverse order.

12) Install the Motor Drive Belt onto the Drive Motor Pulley and then refer to “How to Adjust Motor Drive Belt Tension” to adjust the tension of the Motor Drive Belt.

13) Refer to “How to Align Striding Belt” and “How to Adjust Striding Belt tension”.

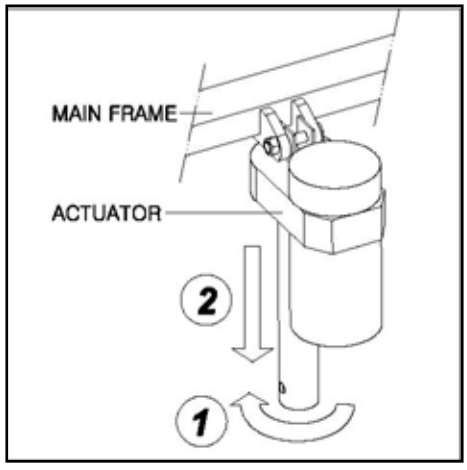
2.11 How to Replace the Incline Motor

Do the steps below while referring to the following Exploded Views in Appendix.
A.1 M990T
B.1 MAIN BODY_FRONT A



1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.
2) Remove three Motor Cover screws (B20) and then lift the cover (T1) out from between the upright Supports.
3) Disconnect the 3-pin Connector from the Lift/Power Board (M10) as indicated in arrow “1”.
4) Disconnect the Incline Motor ground wire by removing one bolt (B30) securing small Transformer (M6).
5) Tilt the treadmill over on its right or left side after putting down soft materials to avoid a scratch on the side of the treadmill.

6) Remove the bolt (B6) and nut (N2) securing the LEG FRAME (M13) and the Shaft Tube of the Incline Motor (M7).
7) Remove the bolt (B8) and nuts (N2 and N3) and then lift the Incline Motor (M7) out from the Main Frame (F1).
8) Install a new Incline Motor in the reverse order of the removal and then make sure that the clearance between the CASTER (M14) and the underside of the Main Frame is between 12 mm and 15 mm as shown. When the clearance is too narrow, remove the bolt (B6) and nut (N2), and then turn the Shaft Tube of the Incline Motor in the direction of the arrow “1” to increase the stroke of the Tube as shown. When the clearance is too wide, turn the Shaft Tube of the Incline Motor in reverse direction of the arrow “1” to adjust the stroke of the Shaft Tube.



10) Reassemble remaining components in the reverse order of removal.

11) Turn on the treadmill and then make sure that the Incline function is working properly.

2.12 How to Replace the Oil Pump

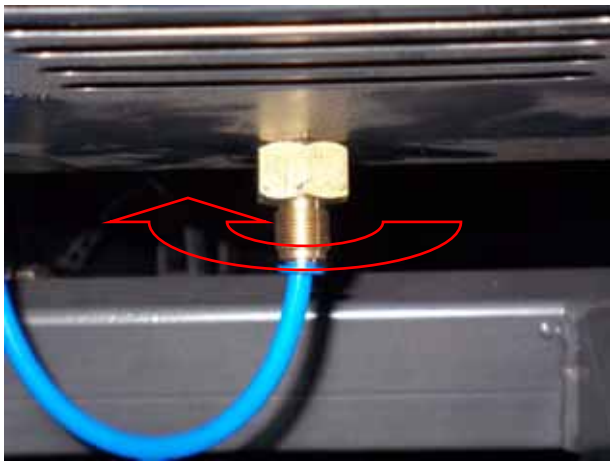
Do the steps below while referring to the following Exploded Views in Appendix.

A.1 M990T

B.1 MAIN BODY_FRONT A

1) Stop the treadmill after lifting up the unit at maximum by operating Incline Motor.

2) Turn off the unit power at the switch at the state of the treadmill lifted-up and then unplug the line cord at wall outlet.



3) Remove three bolts (B20) and then lift Motor Cover (T1) out from between the upright Supports.

4) Locate the Hosepipe (M18) and Socket (M17) under the bottom of the front Frame.

5) Turn the Socket (M17) in the direction of arrow until the Oil Pump (M15) is removed.

6) Re-assemble a new Oil Pump (M15) in the reverse order of removal.

7) Re-assemble the Motor Cover in the reverse of removal.

2.13 How to Replace the Contact Heart Rate Sensor

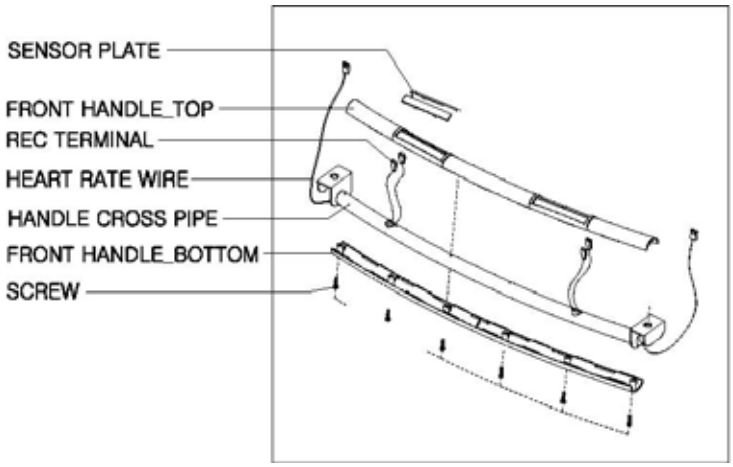
Do the steps below while referring to the following Exploded Views in Appendix.

E.1 CONSOLE ASSEMBLY

1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.

2) Remove four screws (B25) and two screws (B21) securing SIDE HANDLE TOP/BOTTOM (C6, C7, C8 & C9) and then remove SIDE HANDLE TOP/BOTTOM from the Console Assembly..

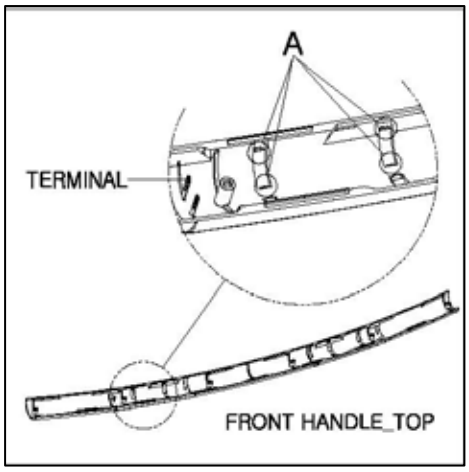
3) Remove six screws (B27) securing the FRONT HANDLE TOP and FRONT HANDLE BOTTOM to the HANDLE CROSS PIPE (C10) and then remove the FRONT HANDLE TOP/BOTTOM from the Console Assembly.



4) Disconnect the sensing wire from the inside TERMINAL of the SENSOR PLATE which is located on the FRONT HANDLE TOP.

Note: The FRONT HANDLE TOP has four SENSOR PLATEs and each SENSOR PLATE has one TERMINAL.

5) Remove the SENSOR PLATE from the FRONT HANDLE TOP by straightening the bent fixing tips indicated as A.



6) Install new sensor in reverse order while bending four fixing tips.

7) Repeat the above steps for the remaining SENSOR PLATE 4) through 6).

SECTION III

HOW TO REPLACE & REPAIR GUIDE

Electronic PCB

3.1 How to Replace the LCD Screen
3.2 How to Replace the MPU Board in Model M990TL and M995TL
3.3 How to Replace the MPU Board in Model M990T and M995T
3.4 How to Replace the Touch Sensitive Key Board
3.5 How to Replace the Lift/Power Board
3.6 How to Replace the A/D Board
3.7 How to Replace the Lamp Inverter Board
3.8 How to Replace the Program Button, OSD Button & Audio Interface Board in Model M990TL and M995TL
3.9 How to Replace the Logo-Lighting & Key Conversion Board in Model M990T and M995T
3.10 How to Replace the CHR (Contact Heart Rate) Board

3.1 How to Replace the LCD Screen

Do the steps below while referring to the following Exploded Views in Appendix and Section 4 ELECTRONIC PCB, CONNECTOR AND CABLE OVERVIEW.

D.1 OVERLAY BEZEL ASSEMBLY

E.1 CONSOLE ASSEMBLY

1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.

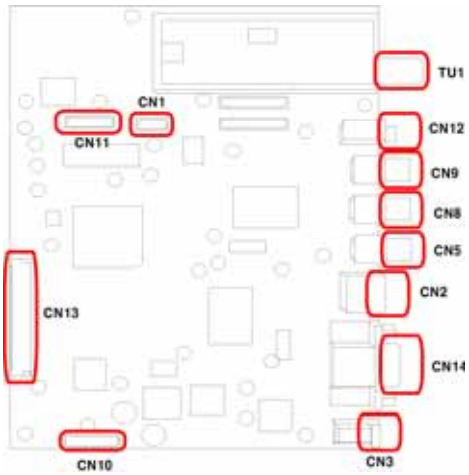
2) Remove eleven screws (B23) from the Console Bottom (C2).

3) Lift off the Console Bottom from the Console Case (C1) while disconnecting the Download Cable (C41) from the MPU PCB (L9).

4) From the underside of the Console Case (C1), remove three screws (B26) securing the Overlay Bezel Assembly to the Console Case.

5) Remove green Earth Cables connected between MPU PCB (L9) and Handle Frame (C3) by removing two screws (B21) from Handle Frame.

6) Disconnect all of electrical connectors from MPU PCB (L9) and the Co-axial Cable(TU1), Stereo Cable (CN12), RCA Cable(CN5, 8, 9), S-VIDEO Cable(CN2) and DC12V Cable(CN3) from the A/D Board (L13).



<The Connectors of A/D Board>

7) Lift out the Overlay Bezel Assembly from the front of Console Case and then put it down on the flat and clean surface so that LCD Screen faces downward.

8) Remove six screws (B33) securing the LCD Metal Bracket (L12) to the LCD Overlay Bezel and then remove the LCD Metal Bracket (L12) from the Overlay Bezel.

9) Disconnect LVDS Cable (CB16) from the LCD screen (L11).

10) Disconnect the Lamp Cable from the Lamp Inverter (L14).

11) Disconnect the OSD Button Cable from either OSD Button PCB (L7) or A/D Board (L13).

12) Reverse LCD Metal Bracket (L12) so that the LCD Screen (L11) faces upward.

13) Remove four bolts (B34) securing the LCD Screen to LCD Metal Bracket and then lift the LCD Screen off.

14) Install new LCD Screen in reverse order.

3.2 How to Replace the MPU Board in Model M990TL and M995TL

Do the steps below while referring to the following Exploded Views in Appendix and Section 4 ELECTRONIC PCB, CONNECTOR AND CABLE OVERVIEW.

D.1 OVERLAY BEZEL ASSEMBLY

E.1 CONSOLE ASSEMBLY

1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.

2) Remove eleven screws (B23) from the Console Bottom (C2).

3) Lift off the Console Bottom from the Console Case (C1) while disconnecting the Download Cable (C41) from the MPU PCB (L9).

4) From the underside of the Console Case (C1), remove three screws (B26) securing the Overlay Bezel Assembly to the Console Case.

5) Remove green Earth Cables (J3) connected between MPU PCB (L9) and Handle Frame (C3) by removing two screws (B21) from Handle Frame.

6) Disconnect all of electrical connectors from MPU PCB (L9) and the Co-axial Cable(TU1), Stereo Cable (CN12), RCA Cable(CN5, 8, 9), S-VIDEO Cable(CN2) and DC12V Cable(CN3) from the A/D Board (L13).

7) Lift out the Overlay Bezel Assembly from the front of Console Case (C1) and then put it down on the flat and clean surface so that the LCD Screen faces downward.

8) Disconnect the Program Button Cable (CB12) from the MPU Board (L9).

9) Disconnect the Ribbon Cable (L4) from the connector CN13 of MPU Board (L9).

10) Remove eight screws (B35) securing MPU Board to the LCD Overlay Bezel and then remove MPU Board from the Overlay Bezel.

11) Install new MPU Board in reverse order. Make sure that all connectors and the Ribbon Cable are securely fastened.

3.3 How to Replace the MPU Board in Model M990T and M995T

Do the steps below while referring to the following Exploded Views in Appendix and Section 4 ELECTRONIC PCB, CONNECTOR AND CABLE OVERVIEW.

D.1 OVERLAY BEZEL ASSEMBLY

E.1 CONSOLE ASSEMBLY

1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.

2) Remove eleven screws (B23) from the Console Bottom (C2).

3) Lift off the Console Bottom from the Console Case (C1) while disconnecting the Download Cable (C41) from the MPU PCB (D4).

4) From the underside of the Console Case (C1), remove three screws (B26) securing the Overlay Bezel Assembly (DOT TYPE) to the Console Case.

5) Remove green Earth Cables (J3) connected between MPU PCB (D4) and Handle Frame (C3) by removing two screws (B21) from Handle Frame.

6) Disconnect all of electrical connectors from the MPU PCB (D4).

7) Lift out the Overlay Bezel Assembly (DOT TYPE) from the front of Console Case (C1) and then put it down on the flat and clean surface so that the Display faces downward.

8) Disconnect the Logo Backlight Cable (CB9) from the MPU Board (D4).

9) Disconnect the Key Conversion Cable (CB6) from the MPU Board (D4).

10) Disconnect the Ribbon Cable (D2) from the connector CN13 of MPU Board (D4).

11) Remove nine screws (B33) securing MPU Board to the Overlay Bezel (DOT TYPE) and then remove MPU Board from the Overlay Bezel.

12) Install new MPU Board (D4) in reverse order. Make sure that all connectors and the Ribbon Cable are securely fastened.

3.4 How to Replace the Touch Sensitive Key Board

Do the steps below while referring to the following Exploded Views in Appendix and Section 4 ELECTRONIC PCB, CONNECTOR AND CABLE OVERVIEW.
E.1 CONSOLE ASSEMBLY

1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.
2) Remove eleven screws (B23) from the Console Bottom (C2).
3) Lift off the Console Bottom from the Console Case (C1) while disconnecting the Download Cable (C41) from the MPU PCB.
4) Disconnect the Touch Sensitive Key Cable (CB3L) from the left Touch Sensitive Key Board (C14).
For the right Touch Sensitive Key Board (C15), disconnect the Cable (CB3R).
5) Remove eight screws (B35) and then remove the Touch Sensitive Key Board (C14 or C15) from the Console Case (C1).
6) Install new the Touch Sensitive Key Board (C14 or C15) in reverse order.

3.5 How to Replace the Lift/Power Board

Do the steps below while referring to the following Exploded Views in Appendix and Section 4 ELECTRONIC PCB, CONNECTOR AND CABLE OVERVIEW.

A.1 M990T

B.1 MAIN BODY_FRONT A

1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.

2) Remove three bolts (B20) and then lift Motor Cover(T1) out from between the upright Supports.

3) Disconnect all of cables from the Lift/Power Board (M10).

4) Remove four screws (B30) securing the Lift/Power Board (M10) and lift out the Lift/Power Board (M10) from the base frame.

5) Install new Lift/Power Board (M10) in reverse order.

3.6 How to Replace the A/D Board

Do the steps below while referring to the following Exploded Views in Appendix and Section 4 ELECTRONIC PCB, CONNECTOR AND CABLE OVERVIEW.

D.1 OVERLAY BEZEL ASSEMBLY

E.1 CONSOLE ASSEMBLY

1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.

2) Remove eleven screws (B23) from the Console Bottom (C2).

3) Lift off the Console Bottom from the Console Case (C1) while disconnecting the Download Cable (C41) from the MPU PCB (L9).

4) Disconnect all of cables from the A/D Board (L13).

5) Remove four screws (B34) securing the A/D Board (L13) and then remove the A/D Board (L13) from the LCD Metal Bracket (L12).

6) Install new A/D Board (L13) in reverse order.

3.7 How to Replace the Lamp Inverter Board

Do the steps below while referring to the following Exploded Views in Appendix and Section 4 ELECTRONIC PCB, CONNECTOR AND CABLE OVERVIEW.

D.1 OVERLAY BEZEL ASSEMBLY

E.1 CONSOLE ASSEMBLY

1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.

2) Remove eleven screws (B23) from the Console Bottom (C2).

3) Lift off the Console Bottom (C2) from the Console Case (C1) while disconnecting the Download Cable (C41) from the MPU PCB (L9).

4) Disconnect the Lamp Inverter Cable (CB17) from the Lamp Inverter Board (L14).

5) Disconnect the Lamp Cable between the Lamp Inverter Board (14) and LCD Screen (L11).

5) Remove two screws (B34) securing the Lamp Inverter Board (L14) and then remove the Lamp Inverter Board (L14) from the LCD Metal Bracket (L12).

6) Install new Lamp Inverter Board (L13) in reverse order.

3.8 How to Replace the Program Button, OSD Button & Audio Interface Board in Model M990TL and M995TL

Do the steps below while referring to the following Exploded Views in Appendix and Section 4 ELECTRONIC PCB, CONNECTOR AND CABLE OVERVIEW.

D.1 OVERLAY BEZEL ASSEMBLY (LCD TYPE)

E.1 CONSOLE ASSEMBLY

1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.

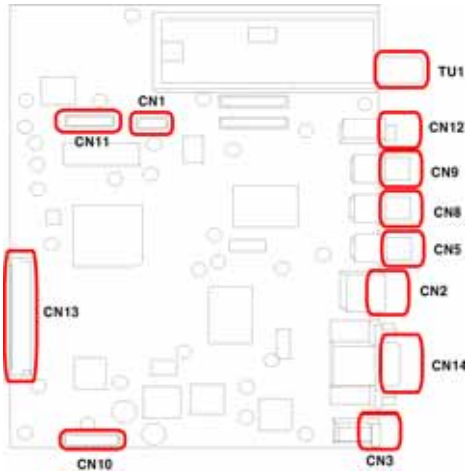
2) Remove eleven screws (B23) from the Console Bottom (C2).

3) Lift off the Console Bottom from the Console Case (C1) while disconnecting the Download Cable (C41) from the MPU PCB (L9).

4) From the underside of the Console Case (C1), remove three screws (B26) securing the Overlay Bezel Assembly to the Console Case.

5) Remove green Earth Cables (J3) connected between MPU PCB (L9) and Handle Frame (C3) by removing two screws (B21) from Handle Frame.

6) Disconnect all of electrical connectors from MPU PCB (L9) and the Co-axial Cable(TU1), Stereo Cable (CN12), RCA Cable(CN5, 8, 9), S-VIDEO Cable(CN2) and DC12V Cable(CN3) from the A/D Board (L13).



<The Connectors of A/D Board>

7) Lift out the Overlay Bezel Assembly from the front of Console Case (C1) and then put it down on the flat and clean surface so that the LCD Screen faces downward.

Program Button Board

8) Disconnect the Program Button Cable (CB12) from the Program Button Board (L6).

9) Remove three screws (B33) securing Program Button Board (L6) and lift off the Program Button Board (L6) from the LCD Overlay Bezel (L5).

10) Install new Program Button Board in reverse order.

OSD Button Board

8) Disconnect the OSD Button Cable (CB15) from the OSD Button Board (L7).

9) Remove three screws (B33) securing the OSD Button Board (L7) and lift off the OSD Button Board (L6) from the LCD Overlay Bezel (L5).

10) Install new OSD Button Board in reverse order.

Audio Interface Board

8) Disconnect the Audio Interface Cable (CB5) from the Audio Interface Board (L8).

9) Remove four screws (B35) securing the Audio Interface Board (L8) and lift off the Audio Interface Board (L8) from the LCD Overlay Bezel (L5).

10) Install new Audio Interface Board (L8) in reverse order.

3.9 How to Replace the Logo-Lighting & Key Conversion Board in Model M990T and M995T

Do the steps below while referring to the following Exploded Views in Appendix and Section 4 ELECTRONIC PCB, CONNECTOR AND CABLE OVERVIEW.

D.1 OVERLAY BEZEL ASSEMBLY (DOT TYPE)

E.1 CONSOLE ASSEMBLY

1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.

2) Remove eleven screws (B23) from the Console Bottom (C2).

3) Lift off the Console Bottom from the Console Case (C1) while disconnecting the Download Cable (C41) from the MPU PCB (D4).

4) From the underside of the Console Case (C1), remove three screws (B26) securing the Overlay Bezel Assembly (DOT TYPE) to the Console Case.

5) Remove green Earth Cables (J3) connected between the MPU PCB (D4) and Handle Frame (C3) by removing two screws (B21) from Handle Frame.

6) Disconnect all of electrical connectors from the MPU PCB (D4).

7) Lift out the Overlay Bezel Assembly (DOT TYPE) from the front of Console Case (C1) and then put it down on the flat and clean surface so that the Display faces downward.

Logo-Lighting Board

8) Disconnect the Logo Backlight Cable (CB9) from the MPU Board (D4).

9) Remove two screws (B33) securing the Logo Backlight Board (D5) and lift off the Logo Backlight Board (D5) from the Overlay Bezel (D3).

10) Install new Logo Backlight Board (D5) in reverse order.

Key Conversion Board

8) Disconnect the Key Conversion Cable (CB6) from the MPU Board (D4).

9) Remove two screws (B35) securing the Key Conversion Board (D6) and lift off the Key Conversion Board (D6) from the Overlay Bezel (D3).

10) Install new Key Conversion Board (D6) in reverse order.

3.10 How to Replace the CHR (Contact Heart Rate) Board or Combo Board

3.10.1 Old Version CHR Board

Note: Old version CHR Board is mounted on MPU Board as Piggy Back Board.

Do the steps below while referring to the following Exploded Views in Appendix and Section 4 ELECTRONIC PCB, CONNECTOR AND CABLE OVERVIEW.

D.1 OVERLAY BEZEL ASSEMBLY

E.1 CONSOLE ASSEMBLY

1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.

2) Remove eleven screws (B23) from the Console Bottom (C2).

3) Lift off the Console Bottom from the Console Case (C1) while disconnecting the Download Cable (C41) from the MPU PCB (L9 or D4).

4) From the underside of the Console Case (C1), remove three screws (B26) securing the Overlay Bezel Assembly (LCD TYPE/DOT TYPE) to the Console Case.

5) Remove green Earth Cables (J3) connected between MPU PCB (L9 or D4) and Handle Frame (C3) by removing two screws (B21) from Handle Frame.

6) Disconnect all of electrical connectors from MPU PCB (L9 or D4).

If the Model is M990TL or M995TL with LCD Screen, disconnect the Co-axial Cable(TU1), Stereo Cable (CN12), RCA Cable(CN5, 8, 9), S-VIDEO Cable(CN2) and DC12V Cable(CN3) from the A/D Board (L13).

7) Lift out the Overlay Bezel Assembly (LCDTYPE/DOT TYPE) from the front of Console Case (C1) and then put it down on the flat and clean surface so that the Display faces downward.

8) Cut Cable Tie Strap securing CHR Board to MPU Board and remove the Cable Tie Strap.

9) Lift off the CHR Board from the MPU Board (L9 or D4).

10) Install new CHR Board(old-version) in reverse order.

3.10.2 Replacing Old Version CHR Board with New Version CHR Board

Note: Replacing Old version CHR Board with New Version CHR Board. Old version CHR Board is located on MPU Board as Piggy Back Board.

Do the steps below while referring to the following Exploded Views in Appendix and Section 4 ELECTRONIC PCB, CONNECTOR AND CABLE OVERVIEW.

D.1 OVERLAY BEZEL ASSEMBLY

E.1 CONSOLE ASSEMBLY

1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.

2) Remove eleven screws (B23) from the Console Bottom (C2).

3) Lift off the Console Bottom from the Console Case (C1) while disconnecting the Download Cable (C41) from the MPU PCB (L9 or D4).

4) From the underside of the Console Case (C1), remove three screws (B26) securing the Overlay Bezel Assembly (LCD TYPE/DOT TYPE) to the Console Case.

5) Remove green Earth Cables (J3) connected between MPU PCB (L9 or D4) and Handle Frame (C3) by removing two screws (B21) from Handle Frame.

6) Disconnect all of electrical connectors from MPU PCB (L9 or D4).

If the Model is M990TL or M995TL with LCD Screen, disconnect the Co-axial Cable(TU1), Stereo Cable (CN12), RCA Cable(CN5, 8, 9), S-VIDEO Cable(CN2) and DC12V Cable(CN3) from the A/D Board (L13).

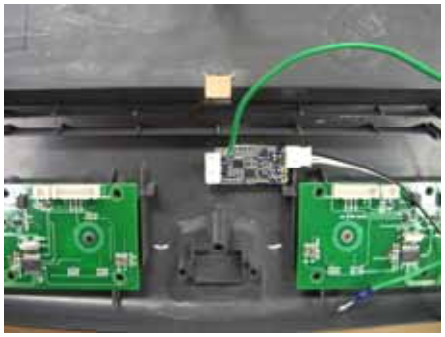
7) Lift out the Overlay Bezel Assembly (LCD TYPE/DOT TYPE) from the front of Console Case (C1) and then put it down on the flat and clean surface so that the Display faces downward.

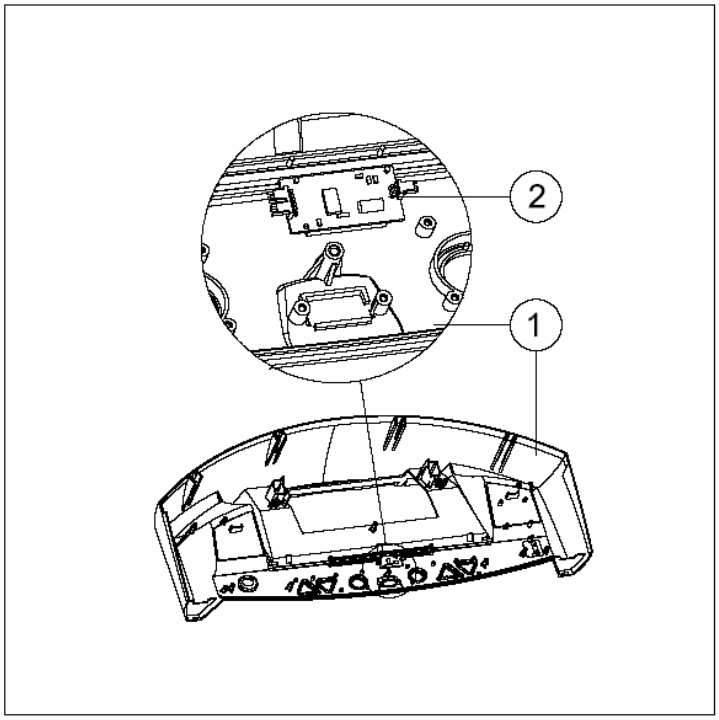
8) Cut Cable Tie Strap securing CHR Board to MPU Board and remove the Cable Tie Strap.

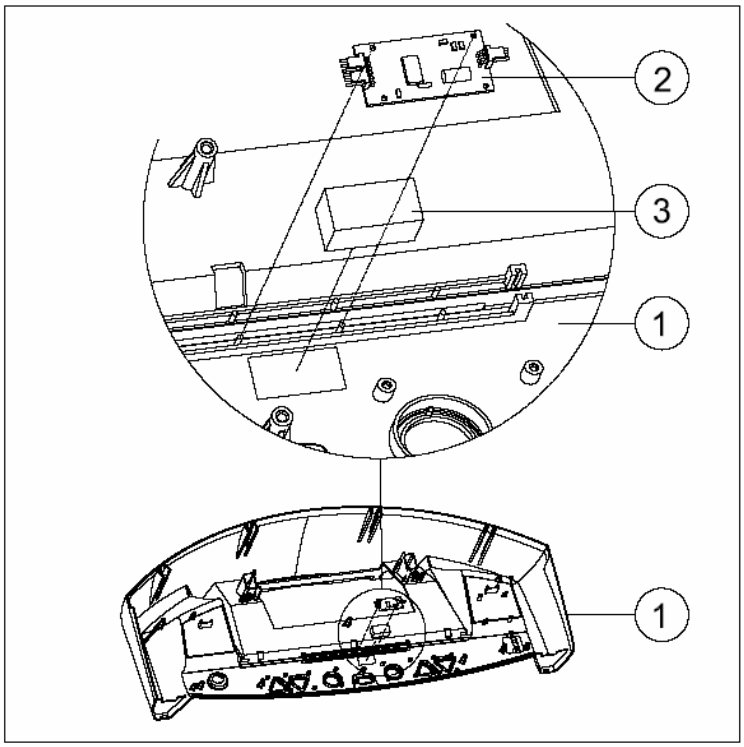
9) Lift off the CHR Board from the MPU Board (L9 or D4).

10) Prepare new CHR Board (4000EX) or Combo Board(8500) which functions as both Wireless Receiver & Contact Heart Rate Monitor) and cut off Ground Line of the CHR Board in green if any. M990 series treadmill requires the Ground Line of the Board eliminated.

11) Attach new CHR Board on the position as shown in figure. Make use of foam which is attached on the backside of CHR Board for fixing the board.







12) Connect 3-pin cable between the CHR Board and MPU PCB (CN7 on L9 Board or CN10 on D4 Board).

13) Connect two 2-pin cables coming from Contact Sensor to the CHR Board.

14) Re-install all of disassembled parts in reverse order.

3.10.3 New Version CHR Board

Do the steps below while referring to the following Exploded Views in Appendix and Section 4 ELECTRONIC PCB, CONNECTOR AND CABLE OVERVIEW.

D.1 OVERLAY BEZEL ASSEMBLY

E.1 CONSOLE ASSEMBLY

1) Turn off the unit power at the switch and then unplug the line cord at wall outlet.

2) Remove eleven screws (B23) from the Console Bottom (C2).

3) Lift off the Console Bottom from the Console Case (C1) while disconnecting the Download Cable (C41) from the MPU PCB (L9 or D4).

4) Disconnect three cables from CHR Board (or Combo Board) and remove the Board from the Console Case.

5) Prepare new CHR Board (or Combo Board which functions as both Wireless Receiver & Contact Heart Rate Monitor) and cut off Ground Line of the CHR Board in green if any. M990 series treadmill requires the Ground Line of the Board eliminated.

6) Install new CHR Board (New Version) in reverse order.

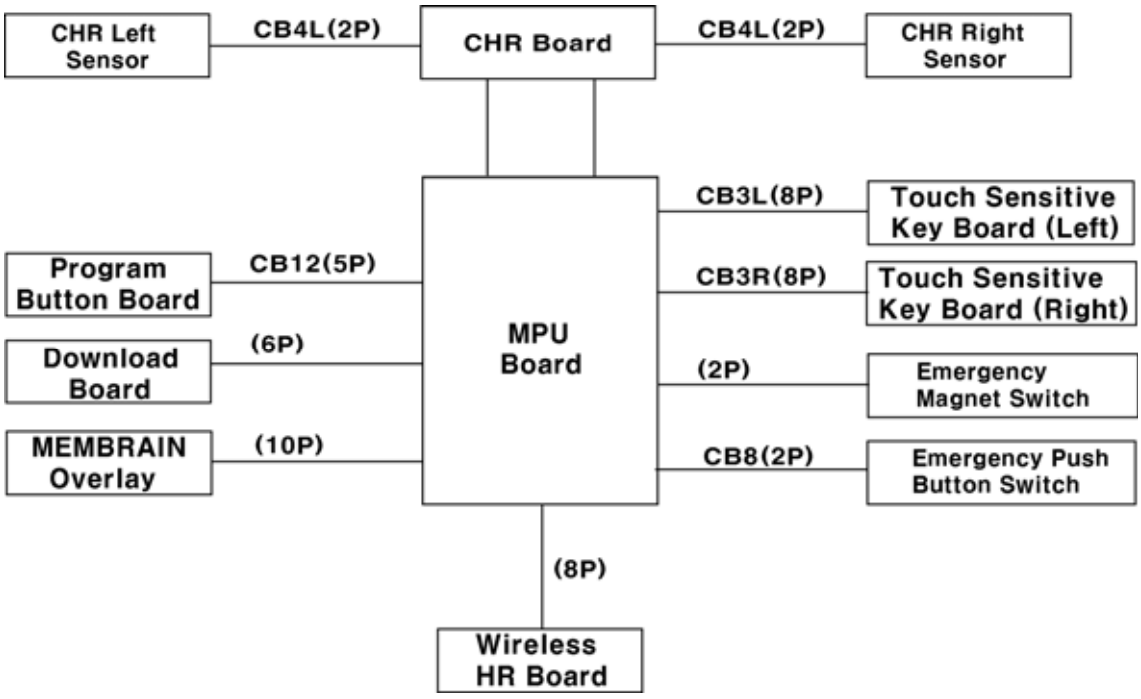
SECTION IV

ELECTRONIC PCB, CONNECTOR AND CABLE OVERVIEW

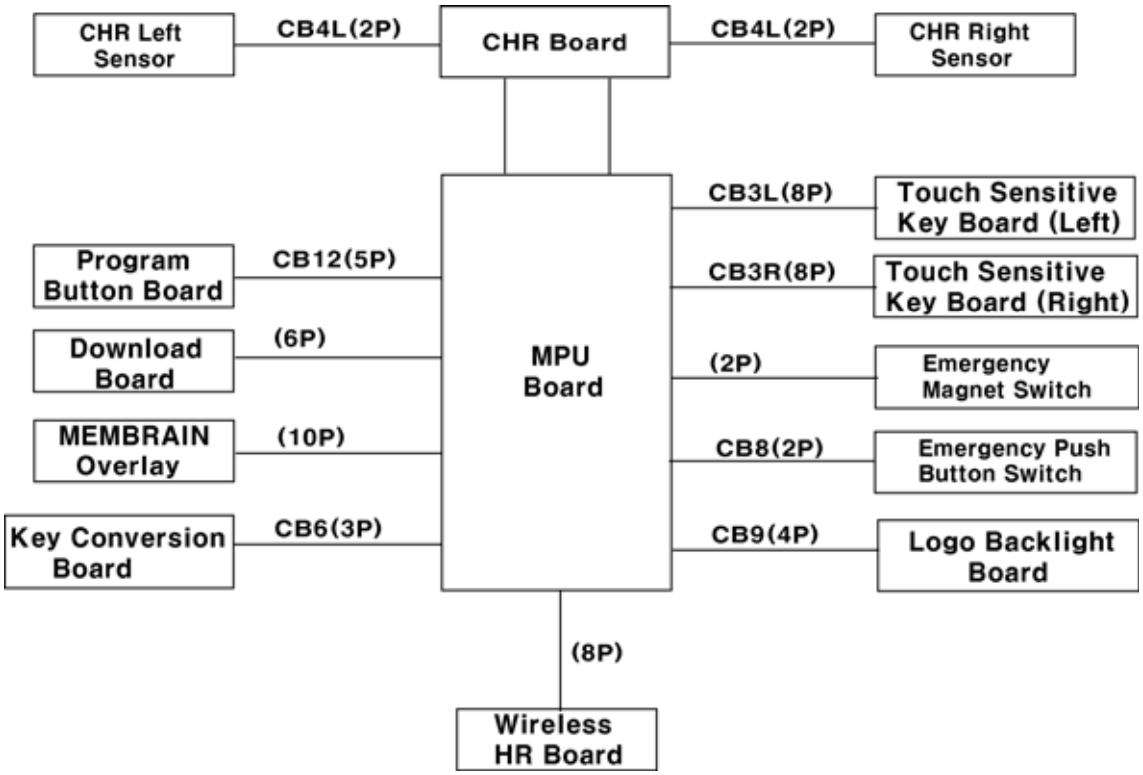
4.1 Cable Connection Block Diagram
4.2 Electronic PCB, Connector and Pin Description
4.3 Cables & Connectors
4.4 Cable Diagram

4.1 Cable Connection Block Diagram

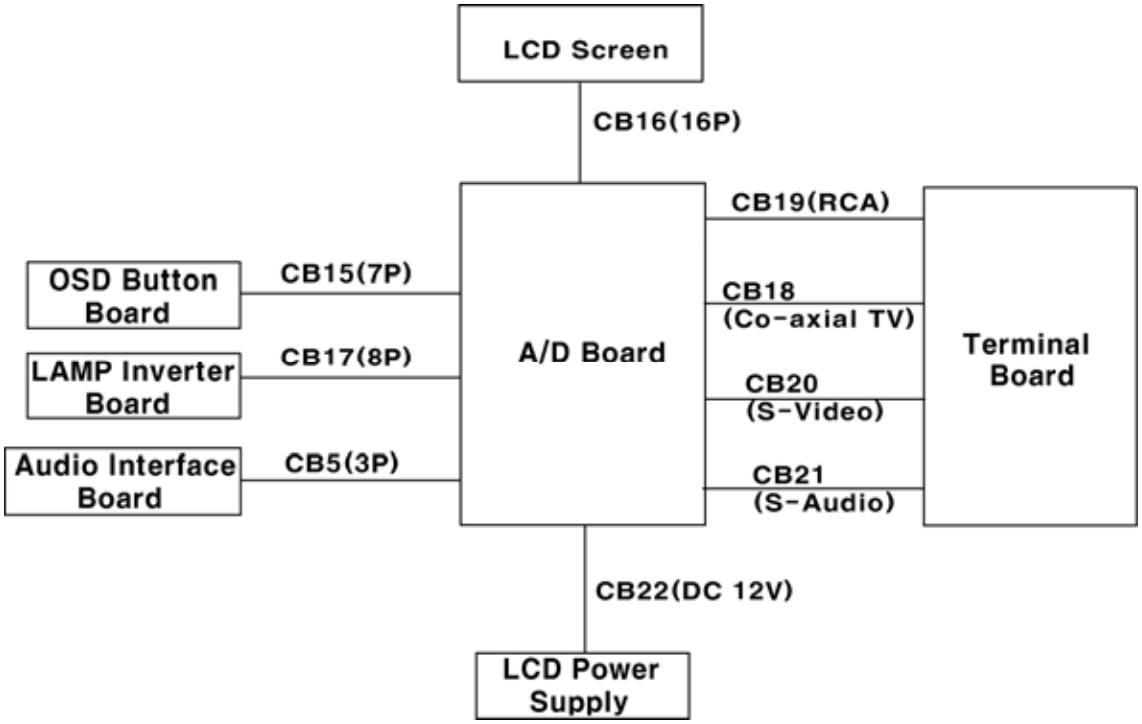
1) MPU PCB (LCD Type)



2) MPU PCB (DOT Type)

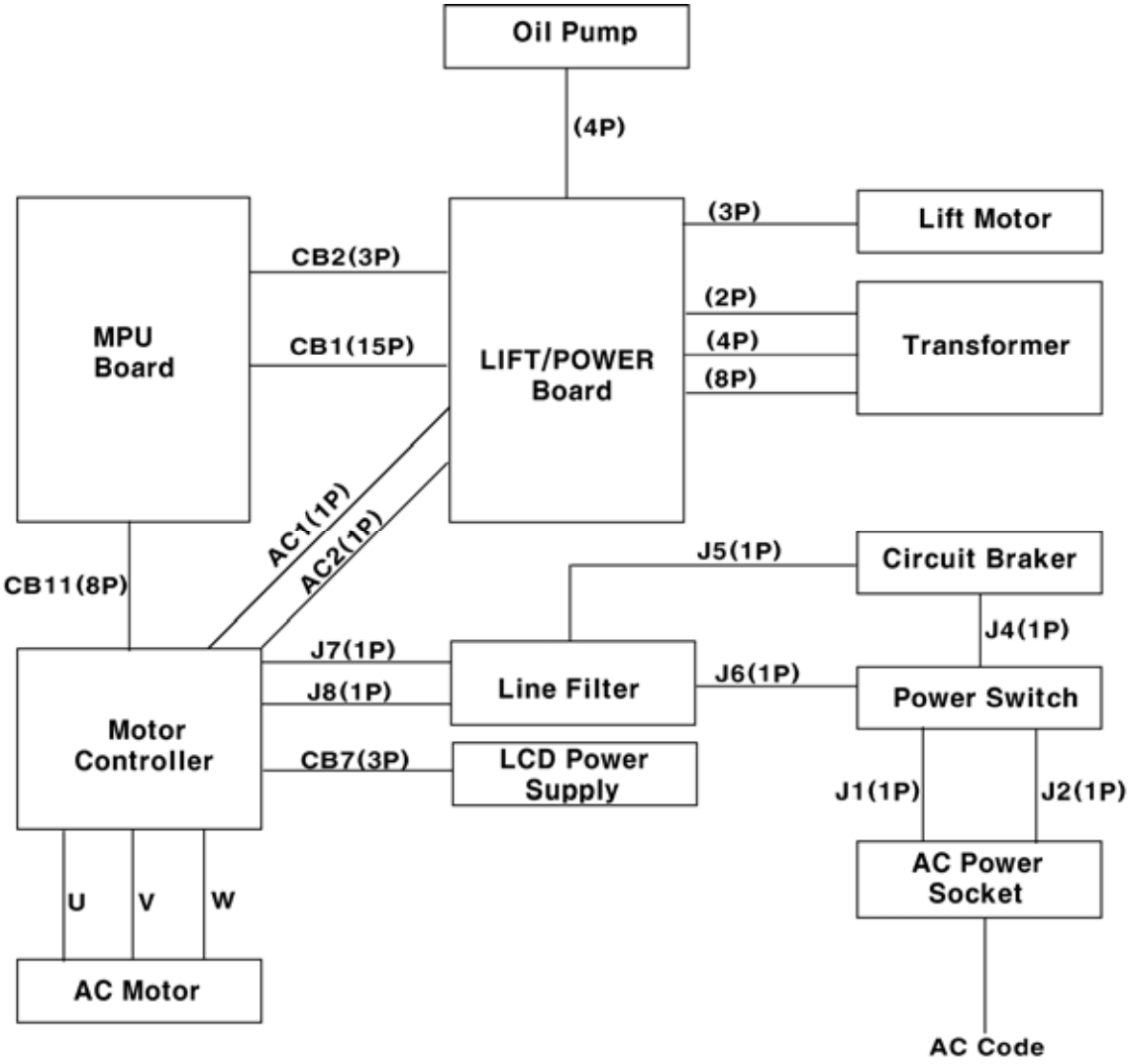


3) A/D BOARD

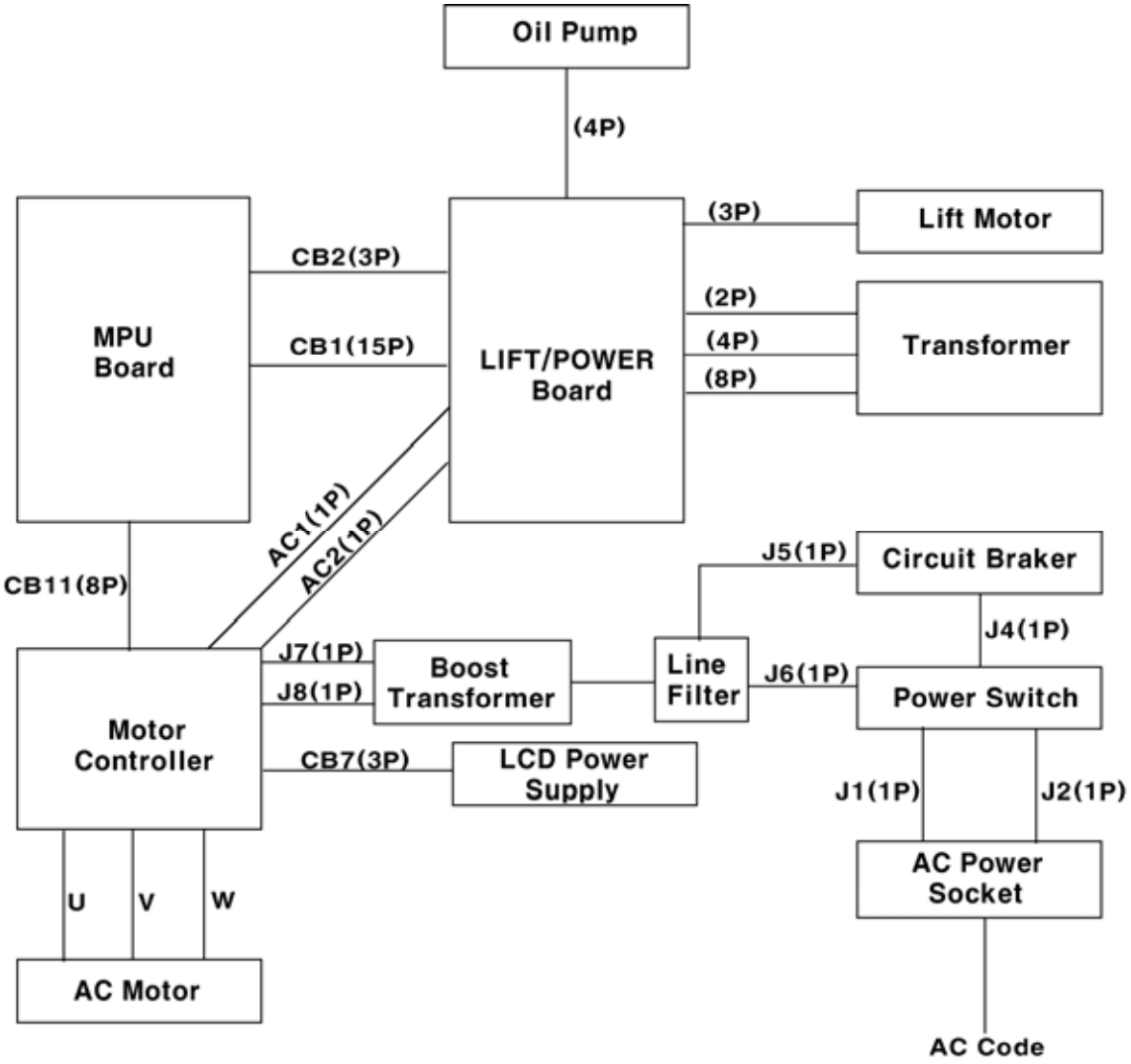

LCD Screen
CB16(16P)
CB19(RCA)
OSD Button Board
CB15(7P)
CB18
(Co-axial TV)
LAMP Inverter Board
CB17(8P)
A/D Board
Terminal Board
CB20
(S-Video)
Audio Interface Board
CB5(3P)
CB21
(S-Audio)
CB22(DC 12V)
LCD Power Supply

4) Lift/Power BOARD

4-1) Supply Voltage: 220/230VAC

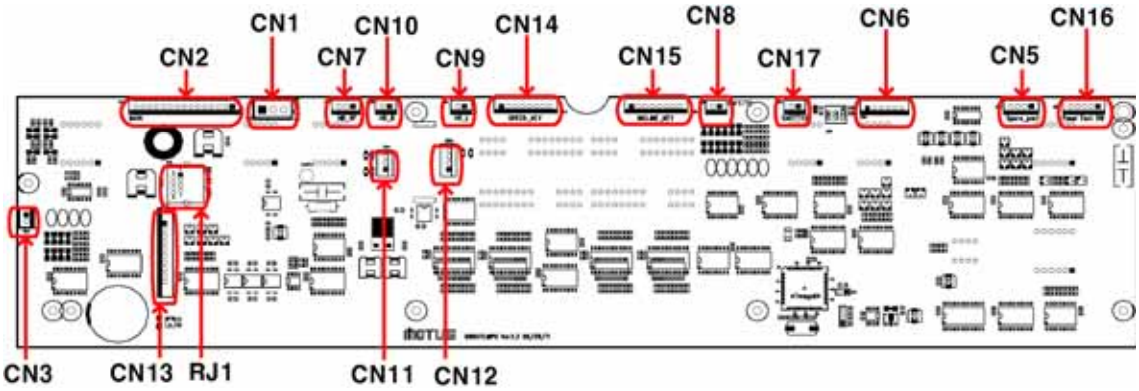


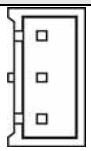
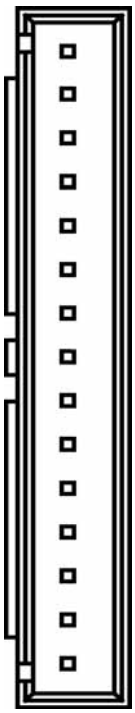
4-2) Supply Voltage: 100/120VAC (USA, Japan)

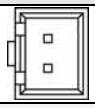
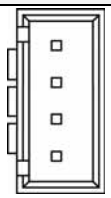
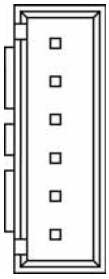
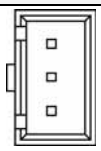
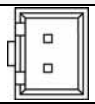
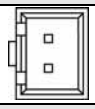
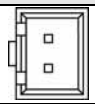


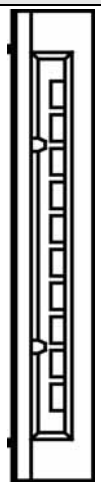
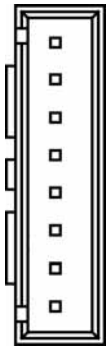
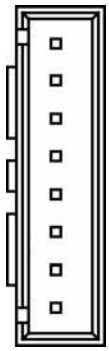
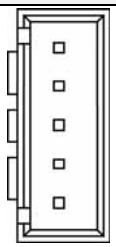
4.2 Electronic PCB, Connector and Pin Description

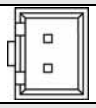
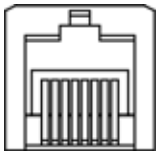
1) MPU (LCD Type), M990TL/M995TL



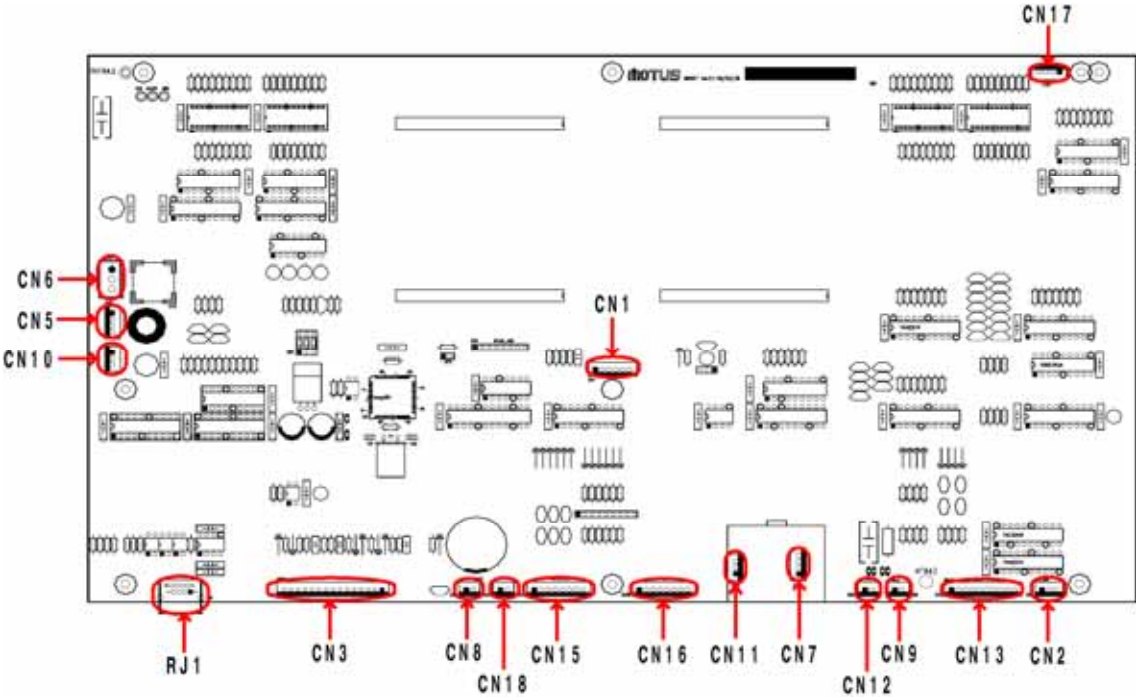
Connector	Location	Pin	Pin Name	Functional Description
CN 1: Main Power It Is connected to Lift/Power PCB		1	VCC3A	5V for DOT Display
		2	GND	Ground
		3	VCC_MPU	5V for System Power
CN 2 : Lift/Power Control It Is connected to Lift/Power PCB		1	GND_HR	Ground for HR
		2	V_HR	Vcc for HR
		3	ENC/P	Encoder Pulse
		4	O/L	Over Load
		5	EMERG	Emergency
		6	INCL_ON	Incline Relay On
		7	INCL_CON	Incline Control
		8	GND_TCH	Touch Board Ground
		9	V_TCH	Touch Board Vcc
		10	GND	System Ground
		11	VCC_12V	12V for Buzzer
		12	Oil_PMP	Oil Pump On/Off
		13	SEN_PMP	Sensing Oiling
		14	N.C	N/C
		15	N.C	N/C

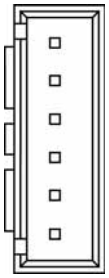
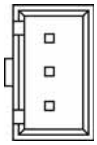
Connector	Location	Pin	Pin Name	Functional Description
CN 3 : TV Power Control		1	N/C	N/C
		2	N/C	N/C
CN 5 : Serial Port (RS-232) (Reserved)		1	VCC	+5V
		2	TXD_PC	Transmit data (M990T → PC)
		3	RXD_PC	Receive data(PC → M990T)
		4	GND	Ground
CN 6 : Program Download It is connected to Download PCB		1	T232/PDO	Program Data Output
		2	VCC	+5V
		3	SCK	Serial Clock
		4	R232/PDI	Program Data Input
		5	RESET	Reset
		6	GND	Ground
CN 7 : Wireless Receiver which is connected to Wireless HR PCB		1	Signal	Receive Signal
		2	VCC	Heart Rate +5V
		3	GND	Heart Rate Ground
CN 8 : Emergency Magnet		1	VCC	+5V
		2	EMG	Emergency
CN 9 : Contact Heart Rate Sensor		1	Signal 1	Touch Plate signal 1-1
		2	Signal 2	Touch Plate signal 1-2
Connector	Location	Pin	Pin Name	Functional Description
CN 10 : Contact Heart Rate Sensor		1	Signal 1	Touch Plate signal 2-1
		2	Signal 2	Touch Plate signal 2-2
CN 18 : Emergency Push Button Switch		1	EMG	Emergency
		2	GND	Ground

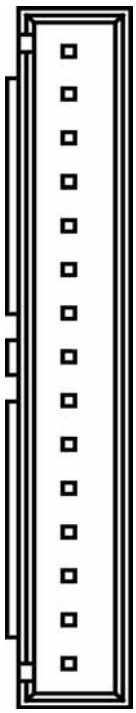
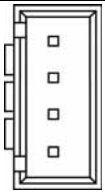
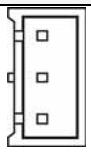
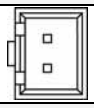
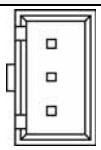
Connector	Location	Pin	Pin Name	Functional Description
CN 13 : Ribbon Connector for Membrane Overlay		1	B4	Data Input 4
		2	B3	Data Input 3
		3	B2	Data Input 2
		4	B1	Data Input 1
		5	Q6	Data Output 6
		6	Q5	Data Output 5
		7	Q4	Data Output 4
		8	Q3	Data Output 3
		9	Q2	Data Output 2
		10	Q1	Data Output 1
CN 14 : Speed & Start Key		1	V_TCH	Touch VCC
		2	GND_TCH	Touch Ground
		3	START/STOP	Start/Stop Key
		4	SPEED-	Speed Down Key
		5	SPEED+	Speed Up Key
		6	LIGHT_CON	사용하지 않음.
		7	VCC3A	System +5V Vcc
		8	GND	System Ground
CN 15 : Incline & Enter Key		1	V_TCH	Touch VCC
		2	GND_TCH	Touch Ground
		3	INCLINE-	Incline Down Key
		4	INCLINE+	Incline Up Key
		5	ENTER	Enter Key
		6	LIGHT_CON	N/C.
		7	VCC3A	System +5V
		8	GND	System Ground
CN 16 : Program Button		1	Q1	Data Output 1
		2	Q2	Data Output 2
		3	Q3	Data Output 3
		4	Q4	Data Output 4
		5	B4	Data Input 4

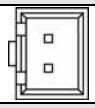
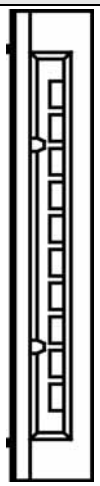
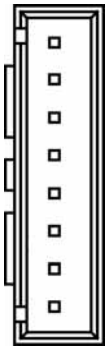
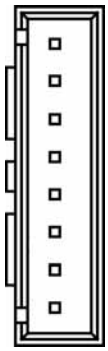
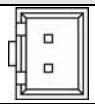
Connector	Location	Pin	Pin Name	Functional Description
CN 17 : Push Button Switch		1	EMG	Emergency
		2	GND	Ground
RJ 1 : Communication for Motor Controller		1	N.C	N/C
		2	N.C	N/C.
		3	SG+	Signal +
		4	N.C	N/C
		5	N.C	N/C.
		6	SG-	Signal -
		7	VDD_485	+5V
		8	GND_485	Ground

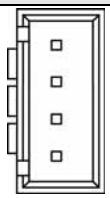
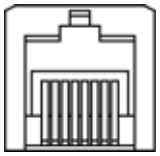
2) MPU (DOT TYPE) M990T/M995T



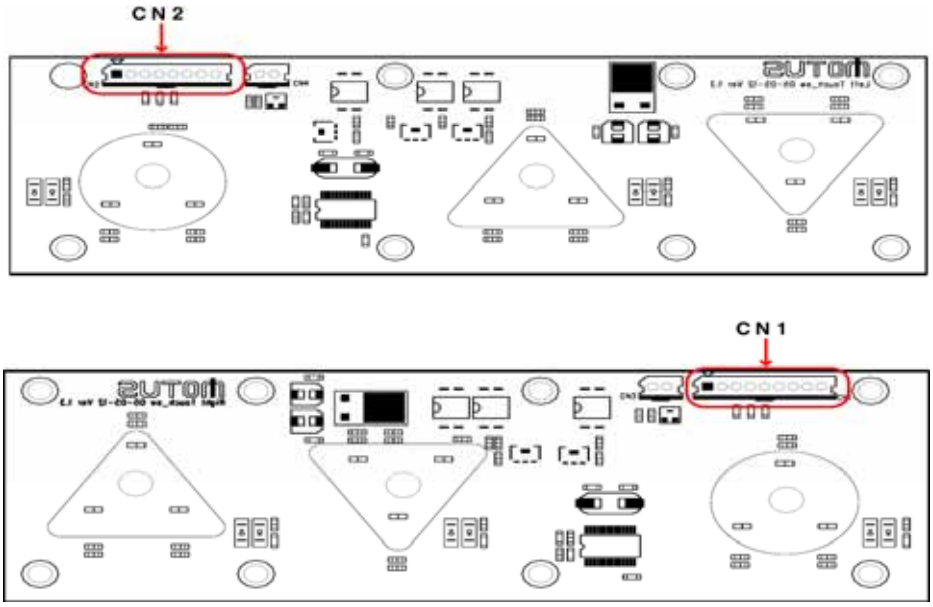
Connector	Location	Pin	Pin Name	Functional Description
CN 1 : Program Download		1	T232/PDO	Program Data Output
		2	VCC	+5V
		3	SCK	Serial Clock
		4	R232/PDI	Program Data Input
		5	RESET	Reset
		6	GND	Ground
CN 2 : Key Conversion for Speed/Incline		1	VCC	System +5V
		2	Key 1	Key Invert signal
		3	Key 2	Key 1 Invert signal

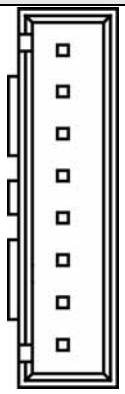
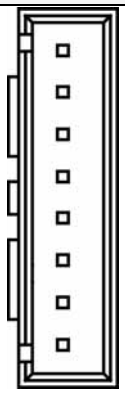
Connector	Location	Pin	Pin Name	Functional Description
CN 3 : Lift/Power Board Control It is connected to Lift/Power PCB.		1	GND_HR	Ground for HR
		2	V_HR	Vcc for HR
		3	ENC/P	Encoder Pulse
		4	O/L	Over Load
		5	EMERG	Emergency
		6	INCL_ON	Incline Relay On
		7	INCL_CON	Incline Control
		8	GND_TCH	Touch Ground
		9	V_TCH	Touch Vcc
		10	GND	System Ground
		11	VCC_12V	12V for Buzzer
		12	Oil_PMP	Oil Pump On/Off
		13	SEN_PMP	Oil Pump sencing
		14	N.C	N/C
		15	N.C	N/C.
CN 5 : Serial Port (RS-232)		1	VCC	+5V
		2	TXD_PC	Transmit data (M990T → PC)
		3	RXD_PC	Receive data(PC → M990T)
		4	GND	Ground
CN 6 : Main Power which is connected to Lift/Power PCB		1	VCC3A	5V for DOT Display
		2	GND	Ground
		3	VCC_MPU	5V for System Power
CN 8 : Magnetic Emergency		1	VCC	+5V
		2	EMG	Emergency
CN 9 : Contact Heart Rate Sensor		1	Signal 1	Touch Plate signal 1-1
		2	Signal 2	Touch Plate signal 1-2
CN 10 : Wireless Receiver which is con- nected to WHR PCB.		1	Signal	Wireless Receive Signal
		2	VCC	Heart Rate +5V
		3	GND	Heart Rate Ground

Connector	Location	Pin	Pin Name	Functional Description
CN 12 : Touch Heart Rate Sensor		1	Signal 1	Touch Plate signal 2-1
		2	Signal 2	Touch Plate signal 2-2
CN 13 : Ribbon Cable for Membrane Overlay		1	B4	Data Input 4
		2	B3	Data Input 3
		3	B2	Data Input 2
		4	B1	Data Input 1
		5	Q6	Data Output 6
		6	Q5	Data Output 5
		7	Q4	Data Output 4
		8	Q3	Data Output 3
		9	Q2	Data Output 2
		10	Q1	Data Output 1
CN 15 : Speed & Enter Key		1	V_TCH	Touch VCC
		2	GND_TCH	Touch Ground
		3	START/STOP	Start/Stop Key
		4	SPEED-	Speed Down Key
		5	SPEED+	Speed Up Key
		6	LIGHT_CON	N/C.
		7	VCC3A	System +5V
		8	GND	System Ground
CN 16 : Incline & Enter Key		1	V_TCH	Touch VCC
		2	GND_TCH	Touch Ground
		3	INCLINE-	Incline Down Key
		4	INCLINE+	Incline Up Key
		5	ENTER	Enter Key
		6	LIGHT_CON	N/C
		7	VCC3A	System +5V
		8	GND	System Ground
CN 18 : Push Button Switch		1	EMG	Emergency
		2	GND	Ground

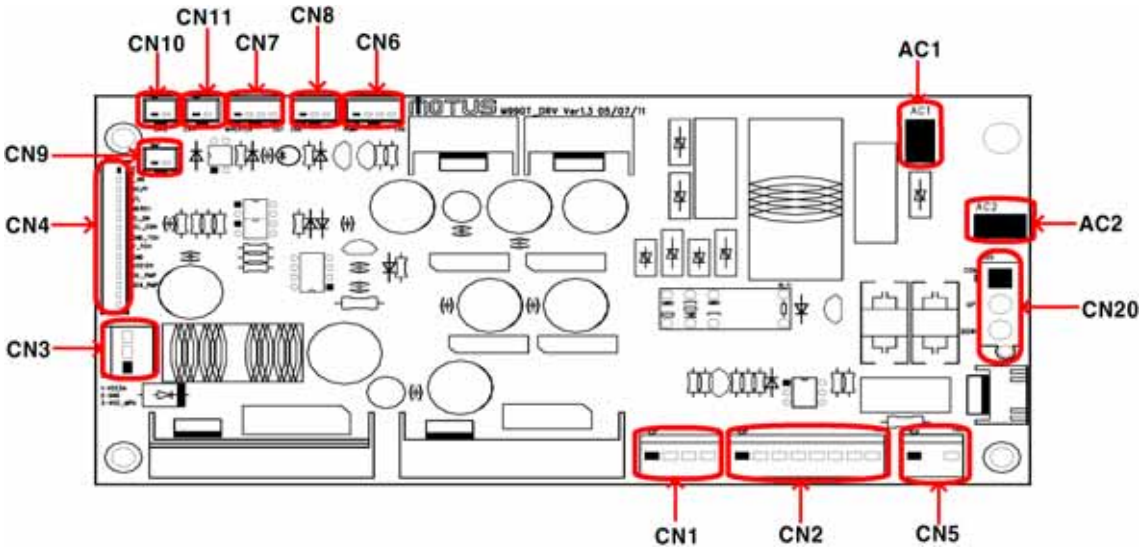
Connector	Location	Pin	Pin Name	Functional Description
CN 17 : Logo Backlight		1	GND	System Ground
		2	VCC3A	System +5V
		3	VCC3A	System +5V
		4	GND	System Ground
RJ 1 : Communication for Motor Controller		1	N.C	N/C
		2	N.C	N/C
		3	SG+	Signal +
		4	N.C	N/C
		5	N.C	N/C
		6	SG-	Signal -
		7	VDD_485	+5V
		8	GND_485	Ground

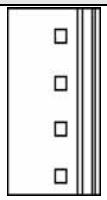
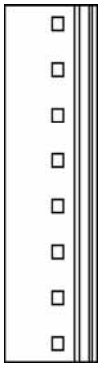
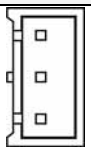
3) Touch Sensitive Key Board

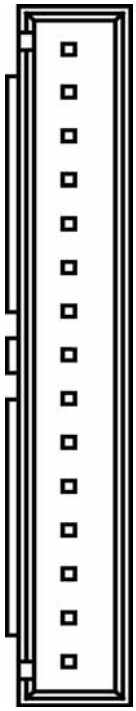
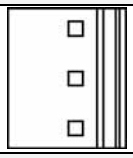
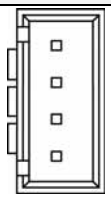
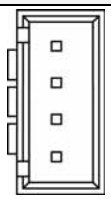
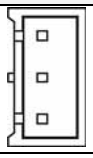


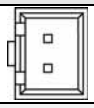
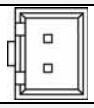
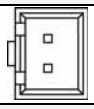
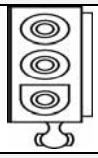
Connector	Location	Pin	Pin Name	Functional Description
CN 1 : Right Touch Sensitive Key. (Start/Stop, Speed Up & Speed Down)		1	V_TCH	Touch VCC
		2	GND_TCH	Touch Ground
		3	START/STOP	Start/Stop Key
		4	SPEED-	Speed Down Key
		5	SPEED+	Speed Up Key
		6	LIGHT_CON	N/C
		7	VCC3A	System +5V
		8	GND	System Ground
CN 2 : Left Touch Sensitive Key. (Enter, Incline Up & Incline Down)		1	V_TCH	Touch VCC
		2	GND_TCH	Touch Ground
		3	INCLINE-	Incline Down Key
		4	INCLINE+	Incline Up Key
		5	ENTER	Enter Key
		6	LIGHT_CON	N/C.
		7	VCC3A	System +5V
		8	GND	System Ground

4) Lift/Power Board

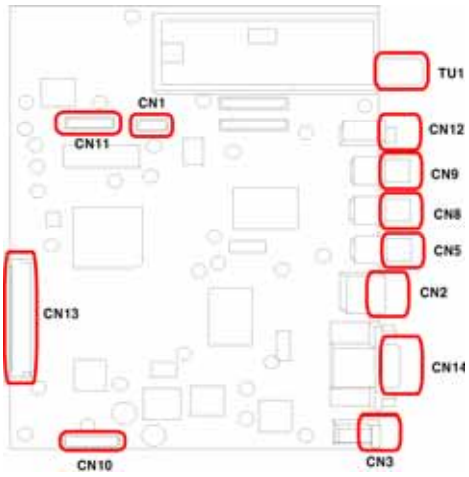


Connector	Location	Pin	Pin Name	Functional Description
CN 1 : Transformer Output		1		AC Power
		2		AC Power
		3		AC Power
		4		AC Power
CN 2 : Transformer Output		1		AC Power
		2		AC Power
		3		AC Power
		4		AC Power
		5		AC Power
		6		AC Power
		7		AC Power
		8		AC Power
CN 3 : Main Power		1	VCC3A	5V for DOT Display
		2	GND	Ground
		3	VCC_MPU	5V for System

Connector	Location	Pin	Pin Name	Functional Description
CN 4 : Lift/Power Board Control		1	GND_HR	Ground for HR
		2	V_HR	Vcc for HR
		3	ENC/P	Encoder Pulse
		4	O/L	Over Load
		5	EMERG	Emergency
		6	INCL_ON	Incline Relay On
		7	INCL_CON	Incline Control
		8	GND_TCH	Touch Ground
		9	V_TCH	Touch Vcc
		10	GND	System Ground
		11	VCC_12V	12V for Buzzer
		12	Oil_PMP	Oil Pump On/Off
		13	SEN_PMP	Sensing Oiling
		14	N.C	N/C
		15	N.C	N/C
CN 5 : Transformer Input		1		AC Power
		2	NC	N/C
		3		AC Power
CN 6 : Oil Pump Control		1	Motor+	Oil pump motor
		2	Motor-	Oil pump motor
		3	Limit Switch-	Oil pump motor
		4	Limit Switch+	Oil pump motor
CN 7 : I/O Interface for Motor Controller		1	RST	N/C
		2	CMT	N/C
		3	O/L	N/C
		4	CM2	N/C
CN 8 : Encoder Pulse		1	VCC_12V	+12V Vcc
		2	ENC/P	Encoder Pulse
		3	GND	Ground

Connector	Location	Pin	Pin Name	Functional Description
CN 9 : Reserved		1		N/C
		2		N/C
CN 10 : Reserved		1		N/C
		2		N/C
CN 11 : Oile Pump Control		1		N/C
		2		N/C
CN 20 : Lift Motor Control		1	COM	Incline Common
		2	UP	Incline Up
		3	DOWN	Incline Down
AC 1 : AC Power		1	AC	220VAC Power Input
AC 2 : AC Power		1	AC	220VAC Power Input

5) A/D Board

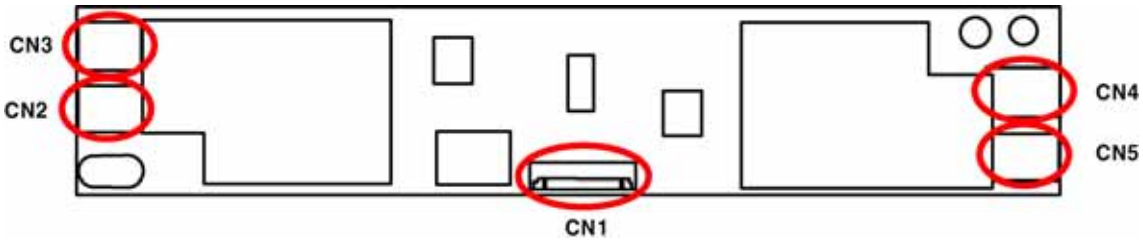


Connector	Location	Pin	Pin Name	Functional Description
CN 1 : Audio Out		1	Audio Left	Audio Left
		2	GND	Ground
		3	Audio Right	Audio Right
		4	GND	Ground
CN 2 : S-VIDEO				SVIDEO Input
CN 3 : DC In				DC 12V/3.5A Input
CN 5 : Video In (RCA)				Video Input (Yellow)
CN 8 : Audio In (RCA)				Audio Input (Red)
CN 9 : Audio In (RCA)				Audio Input (White)
CN 10 : LAMP Inverter Control		1	VCC	DC 12V/3.5A
		2	VCC	DC 12V/3.5A
		3	VCC	DC 12V/3.5A
		4	GND	Ground
		5	GND	Ground
		6	GND	Ground
		7	DIM CTRL	Back Light Intensity Control (DC 0 - 5V)
		8	On/Off	Back Light On/Off Control

Connector	Location	Pin	Pin Name	Functional Description
CN 11 : OSD Button		1	LED1	LDE Lamp
		2	KEY1	Key Input
		3	KEY2	Key Input
		4	5V	Vcc DC 5V
		5	GND	Ground
		6	LED2	LED Lamp
		7	IR	IR Sensor
CN 12 : S-AUDIO In			S-AUDIO In	S-AUDIO Input
CN 14 : RGB In			N/C	N/C
TU 1 : RF ANT In			RF ANT In	Coaxial TV
CN 13 : LVDS Control		1	Vcc	Power
		2	Vcc	Power
		3	Vcc	Power
		4	NC	N/C
		5	NC	N/C
		6	NC	N/C
		7	GND	Ground
		8	E 3+	LVDS EVEN
		9	E 3-	LVDS EVEN
		10	E CLK +	LVDS EVEN
		11	E CLK -	LVDS EVEN
		12	E 2+	LVDS EVEN
		13	E 2-	LVDS EVEN
		14	GND	Ground
		15	E 1+	LVDS EVEN
		16	E 1-	LVDS EVEN
		17	GND	Ground
		18	E 0+	LVDS EVEN
		19	E 0-	LVDS EVEN
CN 13 :		20	O 3+	LVDS ODD

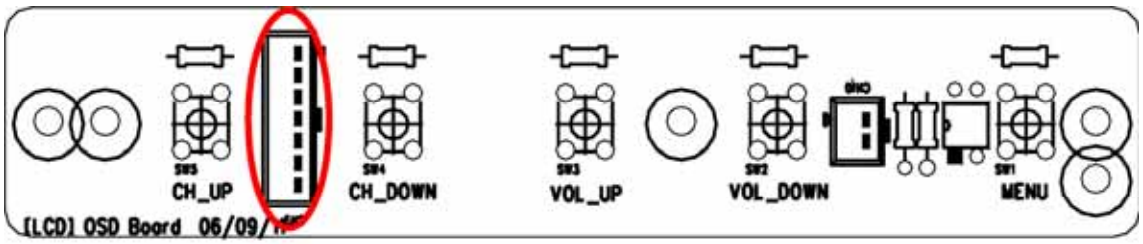
LVDS Control		21	O 3-	LVDS ODD
		22	O CLK +	LVDS ODD
		23	O CLK -	LVDS ODD
		24	GND	Ground
		25	O 2+	LVDS ODD
		26	O 2-	LVDS ODD
		27	O 1+	LVDS ODD
		28	O 1-	LVDS ODD
		29	O 0+	LVDS ODD
		30	O 0-	LVDS ODD

6) LAMP Inverter Board

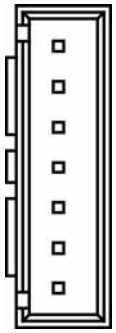


Connector	Location	Pin	Pin Name	Functional Description
CN 1 :		1		Lamp Inverter Control
		2		Lamp Inverter Control
		3		Lamp Inverter Control
		4		Lamp Inverter Control
		5		Lamp Inverter Control
		6		Lamp Inverter Control
		7		Lamp Inverter Control
		8		Lamp Inverter Control
		9		Lamp Inverter Control
		10		Lamp Inverter Control
		11		Lamp Inverter Control
		12		Lamp Inverter Control
CN 2 :				Lamp Power
CN 3 :				Lamp Power
CN 4 :				Lamp Power
CN 5 :				Lamp Power

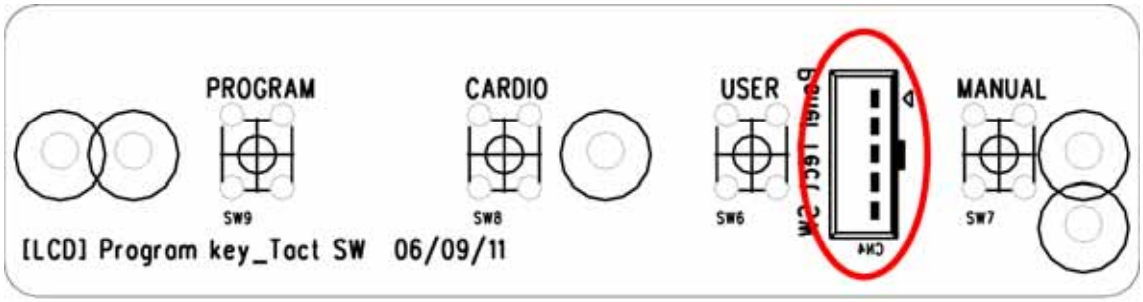
7) OSD Button Board



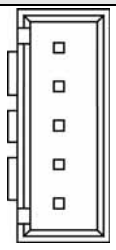
CN3

Connector	Location	Pin	Pin Name	Functional Description
CN 3 :		1	NC	No Connection
		2	KEY1	Key 1 Output (Volume up, Channel down & Channel up)
		3	KEY2	Key 2 Output (Volume down, Power)
		4	5V	Vcc 5V
		5	GND	Ground
		6	NC	N/C
		7	NC	N/C

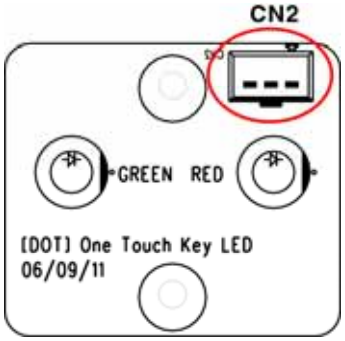
8) Program Button Board

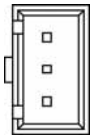


CN4

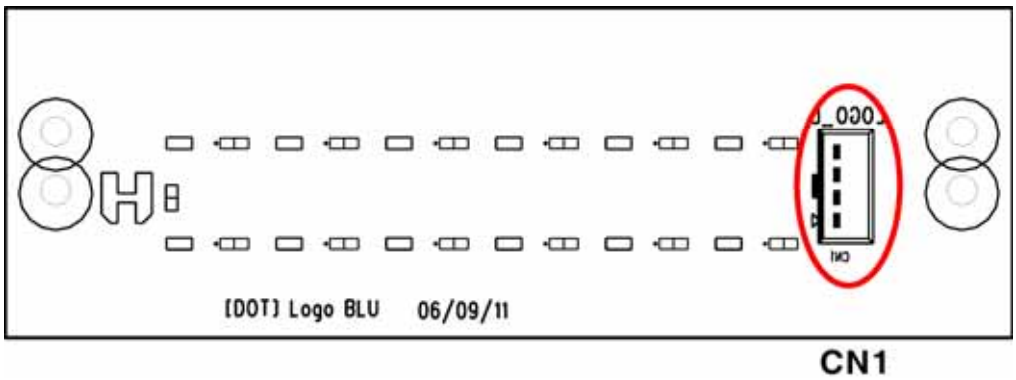
Connector	Location	Pin	Pin Name	Functional Description
CN 4 :		1	Q1	Key Output (Program)
		2	Q2	Key Output (CARDIO)
		3	Q3	Key Output (MANUAL)
		4	Q4	Key Output (USER)
		5	B4	Key Scan Signal

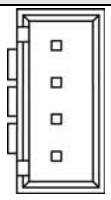
9) Key Conversion Board



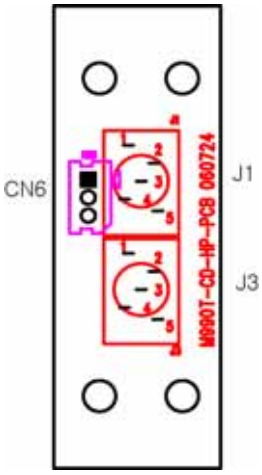
Connector	Location	Pin	Pin Name	Functional Description
CN 2 :		1	VCC	Vcc 5V
		2	10KEY_LED	Key LED RED
		3	10KEY_LED\	Key LED GREEN

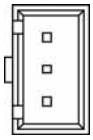
10) Logo Backlight Board



Connector	Location	Pin	Pin Name	Functional Description
CN 1 :		1	GND	Ground
		2	VCC	Vcc 5V
		3	VCC	Vcc 5V
		4	GND	Ground

11) Audio Interface Board



Connector	Location	Pin	Pin Name	Functional Description
CN 6 :		1	Audio-L	Sound Left
		2	Audio-R	Sound Right
		3	GND	Ground

12) Wireless Heart Rate Board

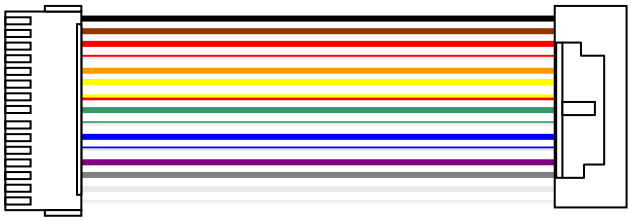
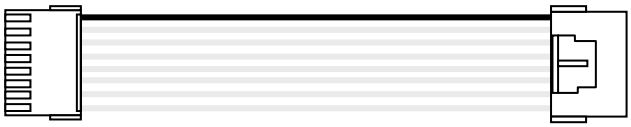
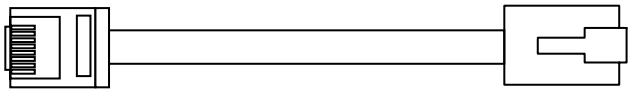
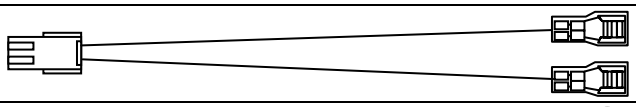
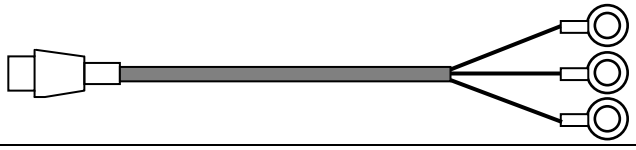
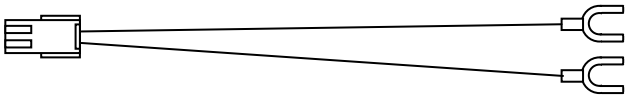
13) Contact Heart Rate Board

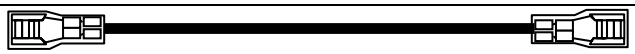
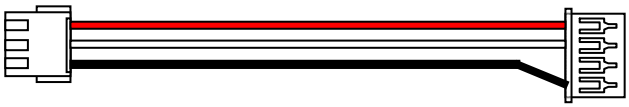
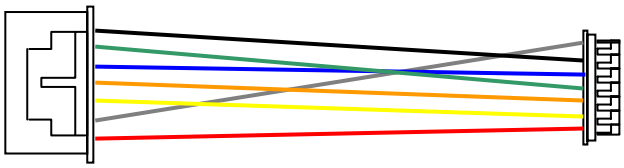
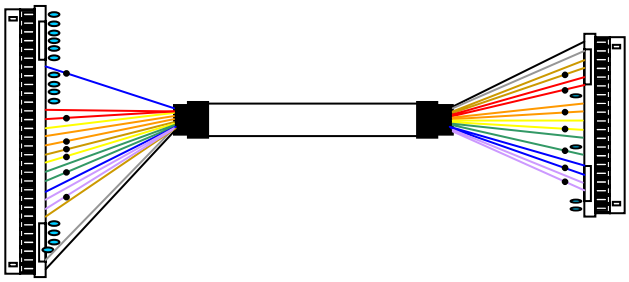
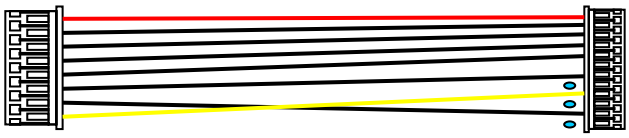
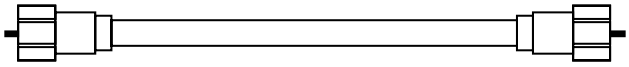
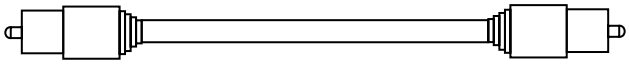
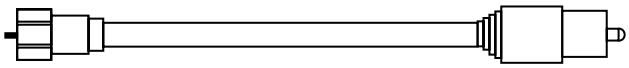
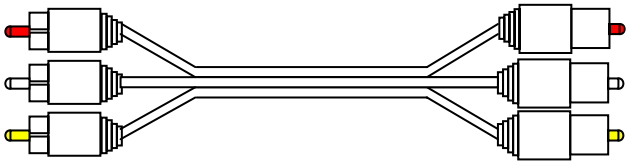
4.3 Cables & Connectors

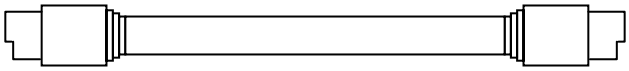
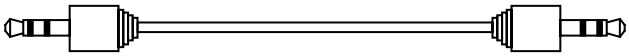
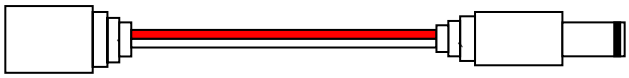
Cable No.	Start Board	Connector No.	End Board	Connector No.	Wire	Length [mm]	Housing	Remark
CB1	Main PCB (Dot Type)	CN3	Lift/Power	CN4	15P	2,000	SMH250-15	
CB2		CN6	Lift/Power	CN3	3P	2,000	LH1143-03	
CB3R		CN15	Touch-Sensitive Right	CN1	8P	270	SMH250-08	
CB3L		CN16	Touch-Sensitive Left	CN2	8P	270	SMH250-08	
CB4R		CN12	HR Sensor-R	-	2P	1,200	SMH250-02	
CB4L		CN9	HR Sensor-L	-	2P	1,200	SMH250-02	
CB6		CN2	Key Conversion	CN2	3P	100	SMH250-03	
CB8		CN18	Emergency Push Button s/w	-	2P	500	SMH250-02	
CB9		CN17	Logo-Lighting	CN1	4P	200	SMH250-04	
CB10		CN10	Wireless HR	POLAR	3P		SMH250-03	
CB11		RJ1	Motor Controller	-	8P	2,000	RJ-45(8P)	
CB1	Main PCB (LCD Type)	CN2	Lift/Power	CN4	15P	2,000	SMH250-15	
CB2		CN1	Lift/Power	CN3	3P	2,000	LH1143-03	
CB11		RJ1	Motor Controller	-	8P	2,000	RJ-45(8p)	
CB3R		CN4	HR Sensor-R	CN1	8P	270	SMH250-08	
CB3L		CN5	HR Sensor-L	CN2	8P	270	SMH250-08	
CB4R		CN10	HR Sensor-R	-	2P	1,200	SMH250-02	
CB4L		CN9	HR Sensor-L	-	2P	1,200	SMH250-02	
CB8		CN17	Emergency Push Button s/w	-	2P	500	SMH250-02	
CB10		CN7	Wireless HR	POLAR	3P		SMH250-03	
CB12		CN16	Program Button	CN4	5P	120	SMH250-05	
CB16	A/D Board	CN13	LCD Screen	-				
CB17		CN10	LAMP Inverter	-				
CB15		CN1	OSD Board	CN3				
CB5		CN11	Audio Interface Board					
CB22	LCD Power Supply	-	A/D Board	CN3				
CB7	Motor Controller		LCD Power Supply		3P	850	Power Code	
CB18	Terminal Board		A/D Board	TU1				
CB20				CN2				
CB21				CN12				

Cable No.	Start Point or Board	Connector No.	End Point or Board	Connector No.	Wire	Length [mm]	Housing	Remark
CB19	Terminal Board	-	AD Board	CN5				Yellow
CB19		-		CN8				Red
CB19		-		CN9				White
J1	AC Inlet-1	-	Switch-11	-				
J2	AC Inlet-2	-	Switch-12	-				
J3	AC Inlet-3	-	Earth	-				
J4	Switch-21	-	Circuit Protector-1	-				
J5	Circuit Protector-2	-	Noise Filter-11	-				
J6	Switch-22	-	Noise Filter-12	-				
J7	Noise Filter-21	-	Motor Controller	R				
J8	Noise Filter-22	-	Motor Controller	T				
AC1	Motor Controller	R	Lift/Power	AC1				
AC2	Motor Controller	T	Lift/Power	AC2				
CB7	Motor Controller	R/T/Earth	LCD Power Supply	-				

4.4 Cable Diagram

Cable No.	Cable Name	Cable Spec	Remark
CB2	Main Power Cable		
CB1	Lift/Power Control Cable		
CB3R,CB3L	Touch Sensitive Key Cable		
CB12	Program Button Cable		
CB9	Logo-Backlight Cable		
CB6	Key Conversion Cable		
CB11	Communication Cable (RJ-45)		
J7, J8	-		
AC1, AC2	-		
CB4L, CB4R	Contact HR Cable		
CB7	LCD Power Supply Cable		
CB8	Emergency Push Button Cable		

Cable No.	Cable Name	Cable Spec	Remark
J3	Earth Cable		
J1, J2, J4, J5, J6	-		
CB5	Audio Interface Cable		
CB15	OSD Button Cable		
CB16	LVDS Cable		
CB17	Lamp Inverter Cable		
CB18	Coaxial Cable (NTSC)		Old type
CB18	Coaxial Cable (PAL/SECAM)		Old type
CB18	Coaxial Cable (NTSC/PAL/SECAM)		New type
CB19	RCA Cable		

Cable No.	Cable Name	Cable Spec	Remark
CB20	S-VIDEO Cable		
CB21	S-AUDIO Cable		
CB22	LCD Power Supply Cable		

APPENDIX

EXPLODED VIEW

A. M990T – PART LIST
A.1. M990T – EXPLODED VIEW

B. MAIN BODY_FRONT – PART LIST
B.1 MAIN BODY_FRONT A – EXPLODED VIEW
B.2 MAIN BODY_FRONT B – EXPLODED VIEW

C. MAIN BODY_REAR – PART LIST
C.1. MAIN BODY_REAR – EXPLODED VIEW

D. OVERLAY BEZEL ASSEMBLY – PART LIST
D.1. OVERLAY BEZEL ASSEMBLY – EXPLODED VIEW

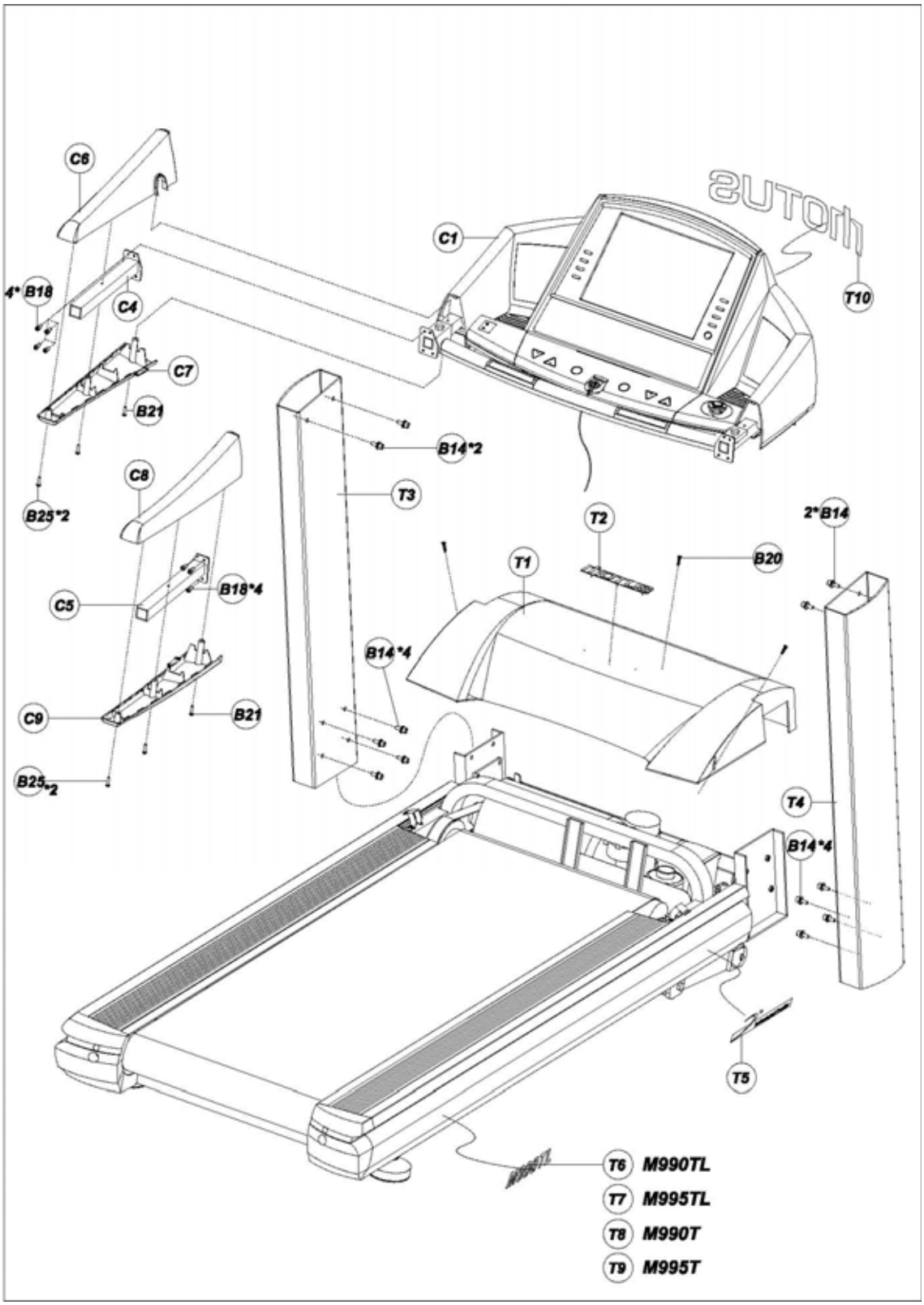
E. CONSOLE ASSEMBLY – PART LIST
E.1 CONSOLE ASSEMBLY - EXPLODED VIEW

F. BOLT, WASHER, NUT & ETC – PART LIST
F.1 BOLT A
F.2 BOLT B
F.3 BOLT C
F.4 WASHER & NUT

A. M990T

NO.	CODE	P/NAME	SPEC	Q'TY
C1	MAP151010	CONSOEL CASE (CONSOLE ASSEMBLY)		1
C4	MAP184100	HANDLE FRAME_L		1
C5	MAP184110	HANDLE FRAME_R		1
C6	MAP184010	SIDE HANDLE_TOP_L		1
C7	MAP184030	SIDE HANDLE_BOTTOM_L		1
C8	MAP184020	SIDE HANDLE_TOP_R		1
C9	MAP184040	SIDE HANDLE_BOTTOM_R		1
T1	MAP191010	MOTOR COVER		1
T2	MAC191020	BADGE-COVER		1
T3	MAP181000	SUPPORT_L		1
T4	MAP182000	SUPPORT_R		1
T5	MAP197010	STICKER_SIDE		2
T6	MAO197020	STICKER_MODEL		2
T7	MAQ197020	STICKER_MODEL		2
T8	MAP197020	STICKER_MODEL		2
T9	MAR197020	STICKER_MODEL		2
T10	MAP151320	CONSOLE BACK LABEL		1

A.1 M990T

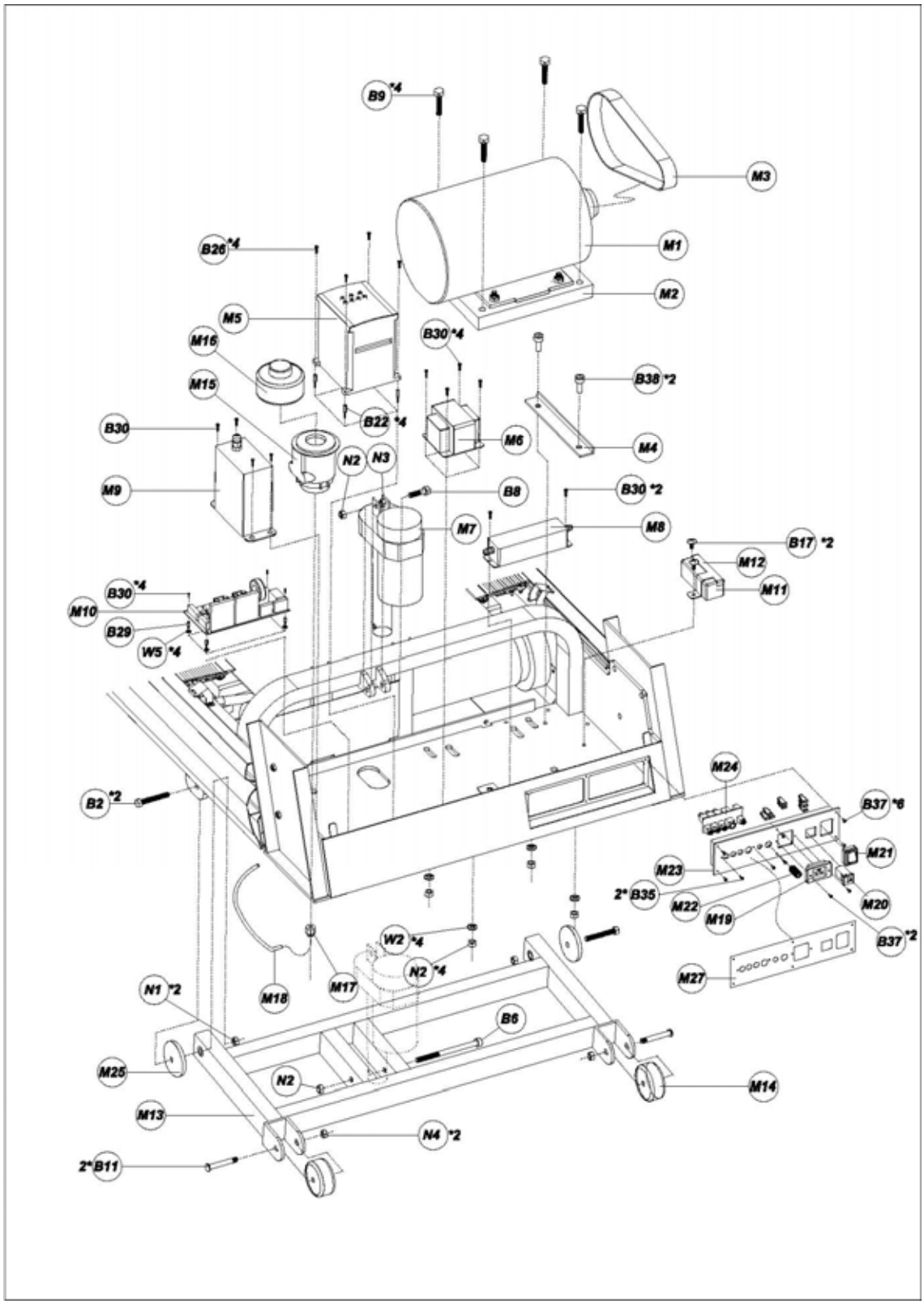

C6
C1
T10
4* B18
C4
C7
B21
B14*2
C8
T3
T2
2*B14
B25*2
T1
B20
B18*4
C5
B14*4
C9
B21
B25*2
T4
B14*4
T5
T6 M990TL
T7 M995TL
T8 M990T
T9 M995T

B. MAIN BODY_FRONT

NO.	CODE	P/NAME	SPEC	Q'TY
M1	MAK131010	MOTOR		1
M2	MAOD31090	MOTOR BASE PLATE	BAKELITE	1
M3	MAP141041	POLY-V BELT		
M4	MAP131090	MOTOR ARRANGEMENT BRACKET		1
M5	MAK171010	INVERTER	N100	1
M6	MAP171030	TRANSFORMER	U.S.A. SPEC	1
M7	MAP122010	LIFT MOTOR		1
M8	MAO499200	LINE FILTER	RF215-TS	1
M8	MAC199200	LINE FILTER for WIRELESS H/R	RF415	1
M8	MAOD99201	LINE FILTER	RF435	1
M9	MAOD71031	BOOST TRANSFORMER		1
M10	MAP171010	LIFT/POWER SUPPLY BOARD		1
M11	MAO167210	LCD POWER SUPPLY	12V/3.5A	1
M12	MAO131100	LCD PPWER SUPPLY BRACKET		1
M13	MAP121020	LEG FRAME		1
M14	MAC114000	CASTER		2
M15	MAP195020	OIL PUMP		1
M16	MAP195020	OIL CASE		1
M17	MAP195020	SOCKET		1
M18	MAP195040	HOSEPIPE		1
M19	MAP171060	AC POWER SOCKET		1
M20	MAC193000	CIRCUIT BRAKER	15AMP	1
M21	MAC192000	POWER SWITCH		1
M22	MAO174010	RF GENDER	NT	1
M22	MAO174020	RF GENDER	PAL	1
M23	MAO111010	TERMINAL PLATE_LCD		1
M24	MAP161010	AUDIO INTERFACE BOARD		1
M25	MAC121010	PE BUSHING		2

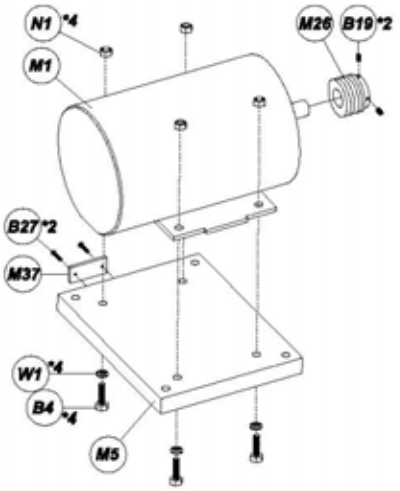
NO.	CODE	P/NAME	SPEC	Q'TY
M26	MAP131060	DRIVE MOTOR PULLEY		1
M27	MAO111040	TERMINAL STICKER_LCD		1
M28	MAPD93000	POWER SWITCH WITH CIRCUIT BREAKER		1
M29	MAOD94001	POWER CODE		1
M30	MAOD90500	POWER CODE HOLDER		1
M31	MAP111010	TERMINAL PLATE_DOT		1
M32	MAOD11010	TERMINAL PLATE_LCD		1
M33	MAPD11010	TERMINAL PLATE_DOT		1
M34	MAP111040	TERMINAL STICKER_DOT		1
M35	MAOD11040	TERMINAL STICKER_LCD		1
M36	MAPD11040	TERMINAL STICKER_DOT		1
M37		BRACKET		1

B.1 MAIN BODY_FRONT A

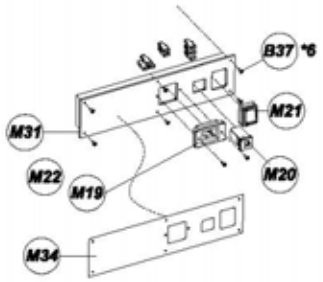


B.2 MAIN BODY_FRONT B

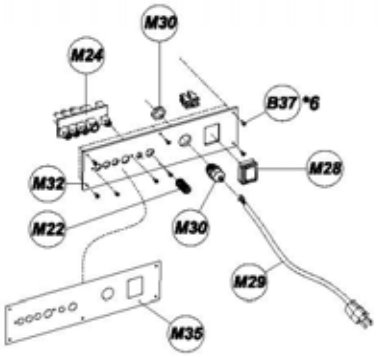
MOTOR ASSEMBLY



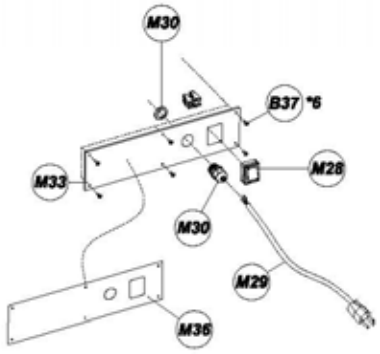
DOT TYPE



U.S.A. LCD TYPE



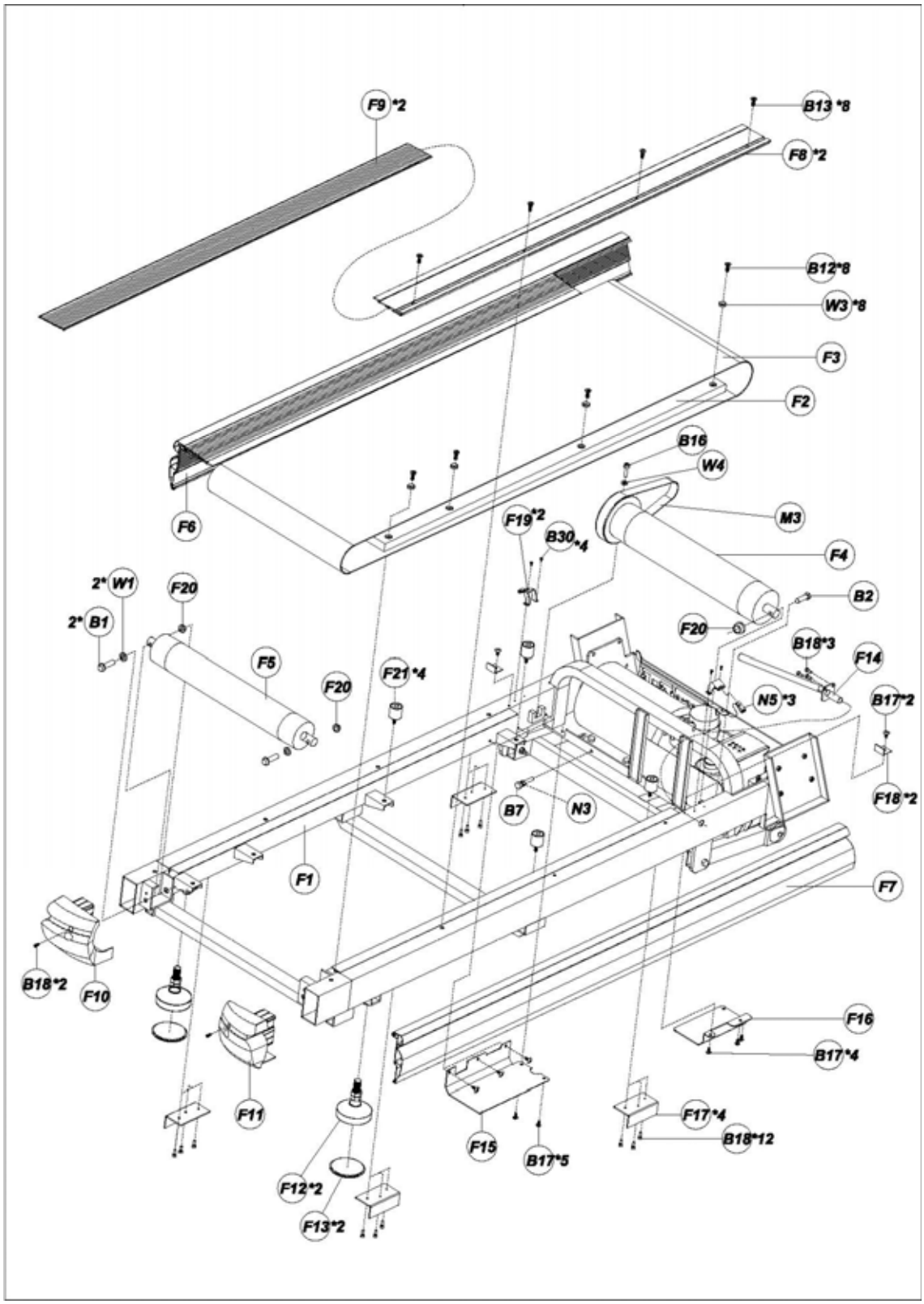
U.S.A. DOT TYPE



C. MAIN BODY_REAR

NO.	CODE	P/NAME	SPEC	Q'TY
F1	MAP111000	MAIN FRAME		1
F2	MAP142010	DECK		1
F3	MAP142000	RUNNING BELT		1
F4	MAP141011	FRONT ROLLER		1
F5	MAP141021	REAR ROLLER		1
F6	MAP144030	NONSLIP SIDE_L		1
F7	MAP144040	NONSLIP SIDE_R		1
F8	MAP144010	NONSLIP TOP		2
F9	MAP144050	NONSLIP PVC		2
F10	MAP145010	END CAP_L		1
F11	MAP145020	END CAP_R		1
F12	MAP112000	STABILIZER		2
F13	MAP113000	STABILIZER RUBBER		2
F14	MAP195050	OIL PIPE		1
F15	MAOD11090	FRONT ROLLER FENCE_L		1
F16	MAOD11100	FRONT ROLLER FENCE_R		1
F17	MAP144060	NONSLIP BRACKET		4
F18	MAP111080	NONSLIP STOPPER		2
F19	MAP191040	MOTOR COVER BRACKET		2
F20	MAC145030	R-ROLLER RUBBER		3
F21	MAC116000	R-CUSHION RUBBER		4
M3	MAP141041	MOTOR DRIVE BELT (POLY-V BELT)		1

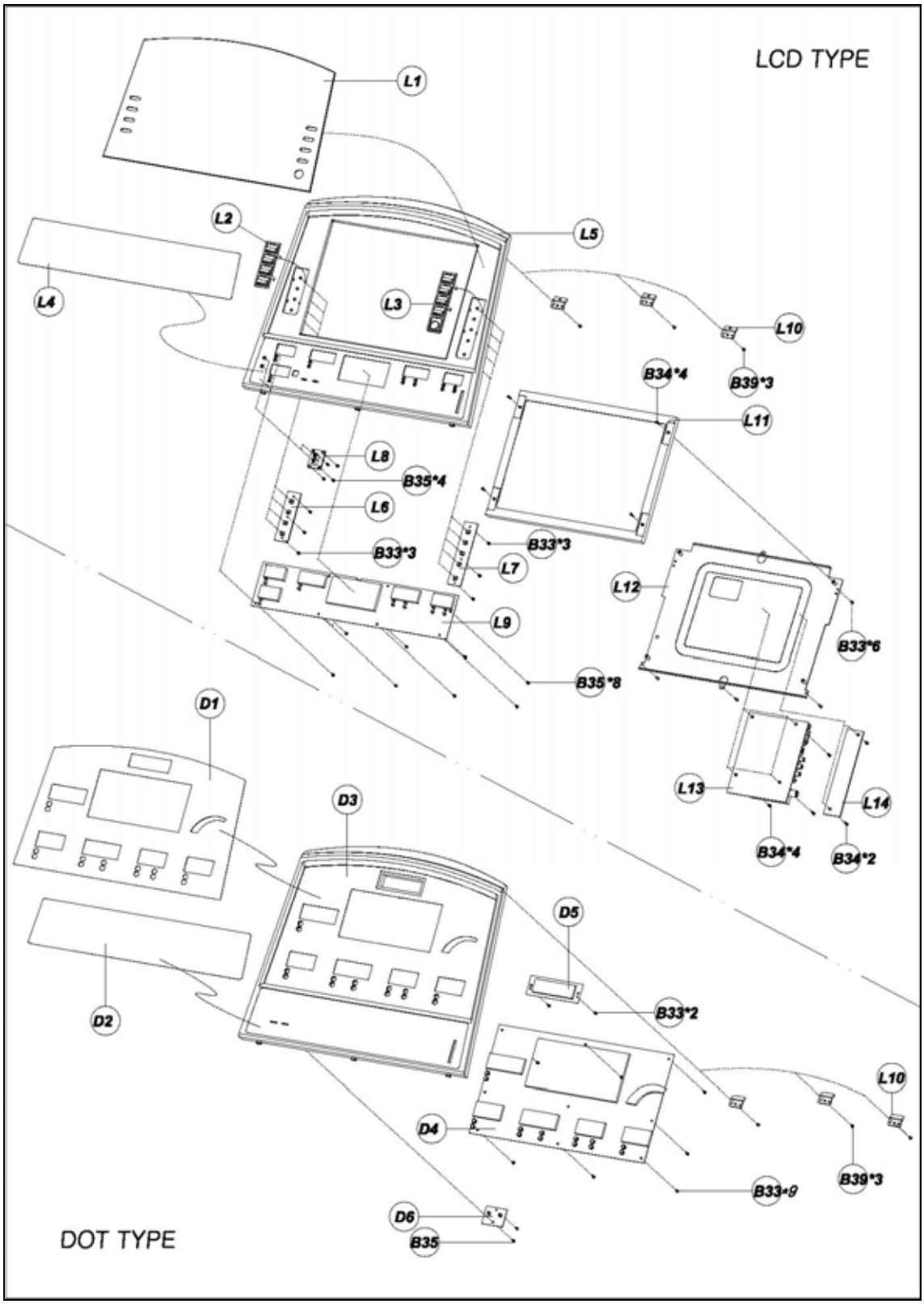
C.1 MAIN BODY_REAR



D. OVERLAY BEZEL ASSEMBLY

NO.	CODE	P/NAME	SPEC	Q'TY
L1	MAO151060	ACRYLIC PANEL LCD		1
L2	MAO151140	BUTTON LCD_L		1
L3	MAO151140	BUTTON LCD_R		1
L4	MAO451020	LCD MEMBRANE OVERLAY	ENGLISH	1
L5	MAO151050	LCD OVERLAY BEZEL	ABS	1
L6	MAO167221	PROGRAM BUTTON BOARD		1
L7	MAO167121	OSD BUTTON BOARD		1
L8	MAP161010	AUDIO INTERFACE BOARD		1
L9	MAO162011	MPU BOARD	LCD	1
L10	MAP151290	PANEL BRACKET		3
L11	MAO167050	LCD SCREEN	15"	1
L12	MAO157060	LCD METAL BRACKET		1
L13	MAO167070	A/D PCB		1
L14	MAO167080	LAMP INVERTER		2
D1	MAP151060	ACRYLIC PANEL DOT		1
D2	MAP451020	DOT MEMBRANE OVERLAY	ENGLISH	1
D3	MAP151050	DOT MEMBRANE OVERLAY		1
D4	MAP162010	MPU BOARD	DOT	1
D5	MAP168010	LOGO BACKLIGHT BOARD	1	1
D6	MAP168030	KEY CONVERSION BOARD	1	1

D.1 OVERLAY BEZEL ASSEMBLY

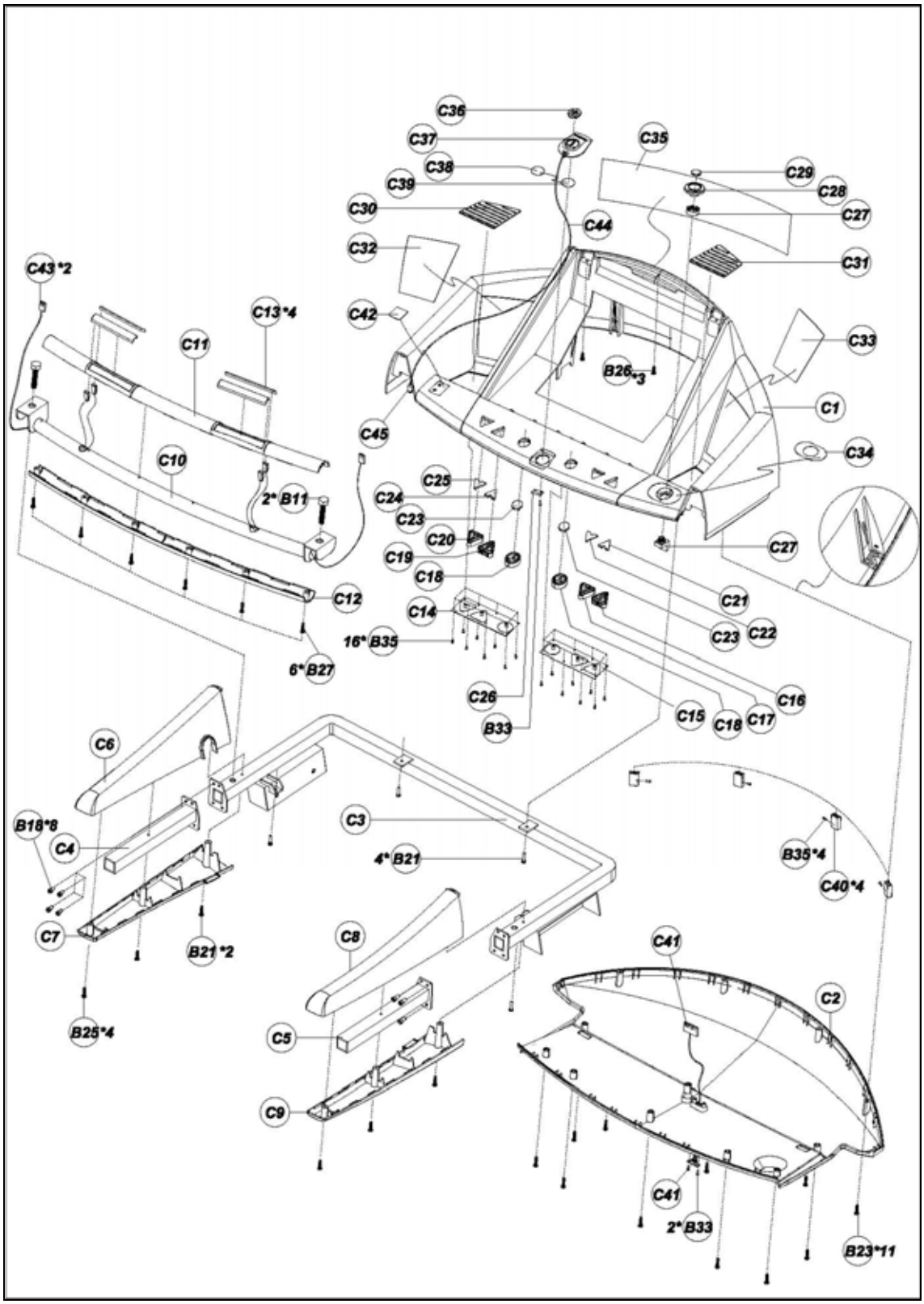


E. CONSOLE ASSEMBLY

NO.	CODE	P/NAME	SPEC	Q'TY
C1	MAP151010	CONSOLE CASE		1
C2	MAP152010	CONSOLE BOTTOM		1
C3	MAP184090	HANDLE FRAME		1
C4	MAP184100	HANDLE FRAME_L		1
C5	MAP184110	HANDLE FRAME_R		1
C6	MAP184010	SIDE HANDLE_TOP_L		1
C7	MAP184030	SIDE HANDEL_BOTTOM_L		1
C8	MAP184020	SIDE HANDLE_TOP_R		1
C9	MAP184040	SIDE HANDLE_BOTTOM_R		1
C10	MAP185000	HANDLE CROSS PIPE		1
C11	MAP185010	FRONT HANDLE_TOP		1
C12	MAP185020	FRONT HANDLE_BOTTOM		1
C13	MAJ182030	SENSOR PLATE		4
C14	MAP164021	TOUCH SENSITIVE KEY BOARD_LEFT		1
C15	MAP164011	TOUCH SENSITIVE KEY BOARD _RIGHT		1
C16	MAP151080	LIGHTING SPEED UP	PC	1
C17	MAP151090	LIGHTING SPEED DOWN	PC	1
C18	MAP151100	LIGHTING START	PC	2
C19	MAP151110	LIGHTING INCLINE UP	PC	1
C20	MAP151120	LIGHTING INCLINE DOWN	PC	1
C21	MAP151200	BUTTON SPEED UP	ABS	1
C22	MAP151210	BUTTON SPEED DOWN	ABS	1
C23	MAP151220	BUTTON START	ABS	2
C24	MAP151230	BUTTON INCLINE UP	ABS	1
C25	MAP151240	BUTTON INCLINE DOWN	ABS	1
C26	MAC162020	EMERGENCY SENSOR		1
C27	MAP154010	EMERGENCY PUSH BUTON SWITCH		1

C28	MAP154020	EMERGENCY PUSH BUTTON SWITCH KNOB		1
NO.	**CODE**	**P/NAME**	**SPEC**	**Q'TY**
C29	MAP154030	EPOXY STICKER		1
C30	MAP151180	KEEPING PAD_L		1
C31	MAP151190	KEEPING PAD_R		1
C32	MAP451160	CONSOLE STICKER_L	ENGLISH	1
C32	MAP151160	CONSOLE STICKER_L	KOREAN	1
C33	MAP451170	CONSOLE STICKER_R	ENGLISH	1
C33	MAP151170	CONSOLE STICKER_R	KOREAN	1
C34	MAP151040	SWITCH STICKER		1
C35	MAP151320	STICKER CONSOLE BACK	MOTUS	1
C36	MAPD11040	SYMBOL MAGNET		1
C37	MAP111010	EMERGENCY MAGNET SWITCH		1
C38	MAOD11010	EMERGENCY STICKER		1
C39	MAPD11010	EMERGENCY PLATE		1
C40	MAP151250	CASE HOLDER		4
C41	MAP152020	DOWNROAD CABLE		1
C42	MAP151030	EARPHONE STICKER		2
C43	MAC184080	CONTACT HEARTRATE WIRE		2
C44	MAC153040	EMERGENCY STRING		1
C45	MAC153060	EMERGENCY STRING CLIP		1

E.1 CONSOLE ASSEMBLY

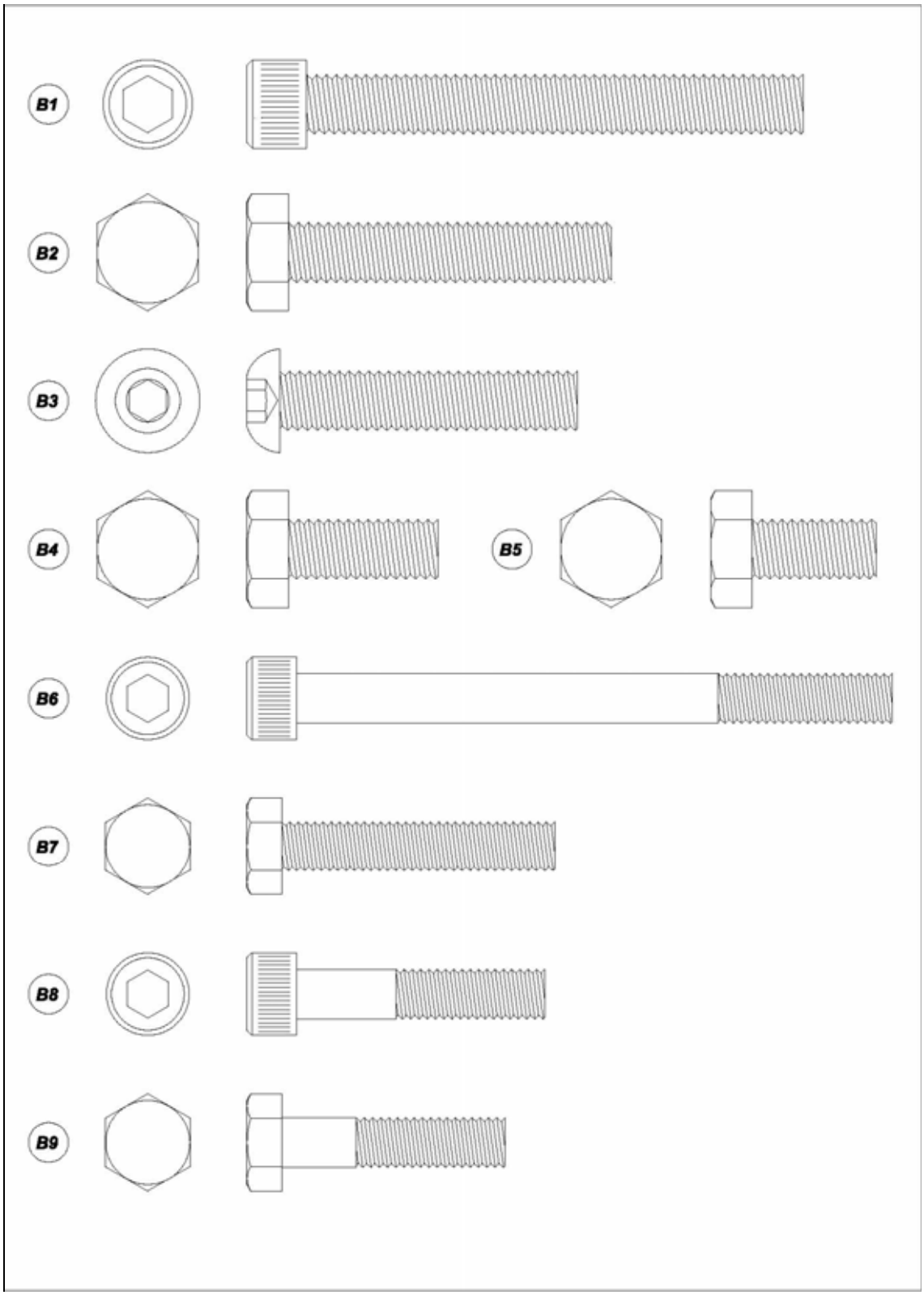


F. BOLT, WASHER & NUT

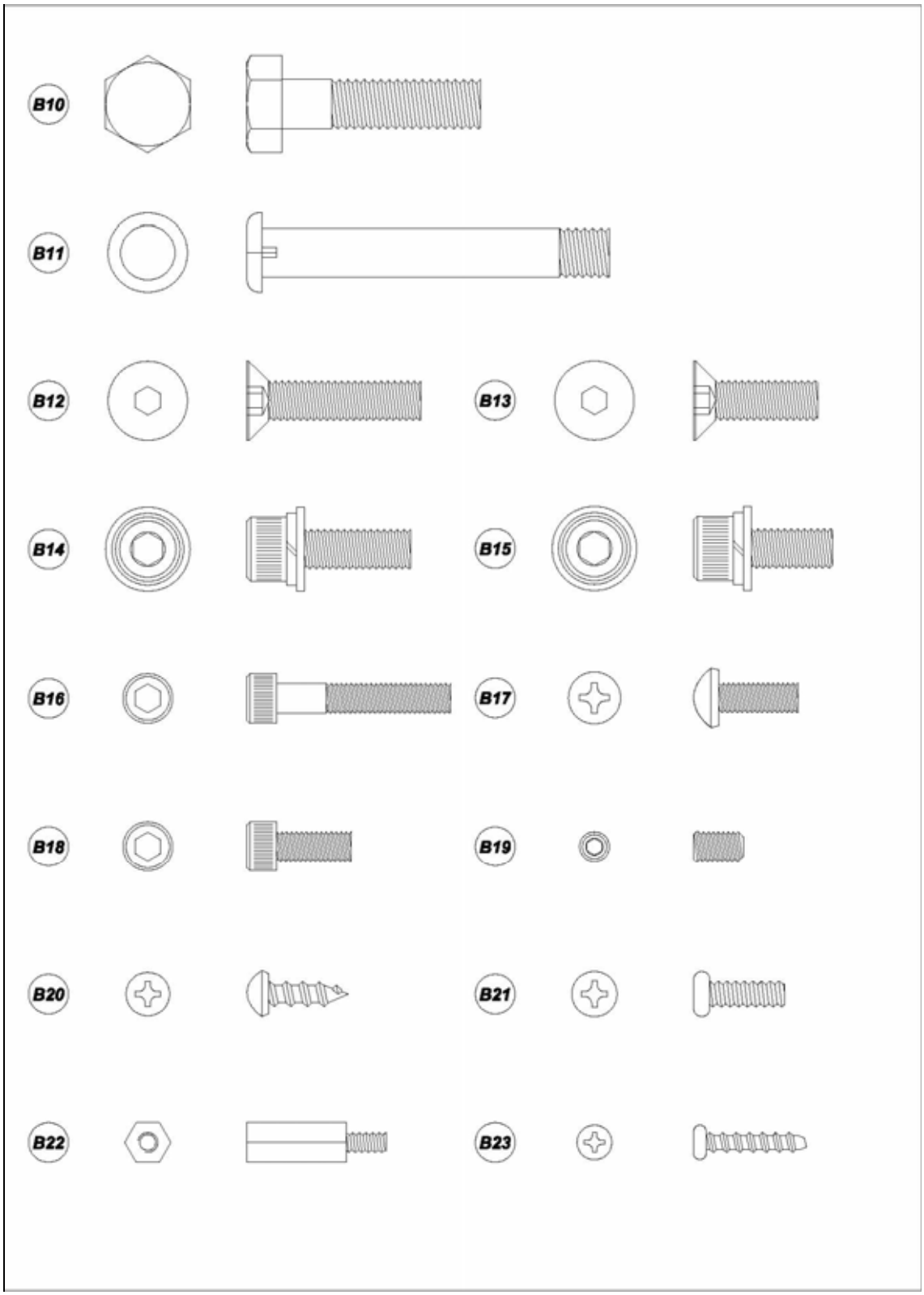
NO.	CODE	P/NAME	SPEC	Q'TY
B1	MA0A12100	ALLEN BOLT	M12*L100	
B2	MA0K12065	HEX BOLT	M12*L65	
B3	MA0C12060	ALLEN BUTTON BOLT	M12*L60	
B4	MA0K12030	HEX BOLT	M12*L30	
B5	MA0K12025	HEX BOLT	M12*L25	
B6	MA0I10120	H/S ALLEN BOLT	M10*L120, TAP35	
B7	MA0K10045	HEX BOLT	M10*L45	
B8	MA0I10050	H/S ALLEN BOLT	M10*L50, TAP30	
B9	MA0J10045	H/S HEX BOLT	M10*L45, TAP30	
B10	MA0J10040	H/S HEX BOLT	M10*L40, TAP30	
B11	MA0K10071	CASTER BOLT	M10/M9,L70 TAP10	
B12	MA0D08035	ALLEN PILLOW BOLT	M8*L35	
B13	MA0D08025	ALLEN PILLOW BOLT	M8*L30	
B14	MA0F08025	SEMS BOLT	M8*L25	
B15	MA0F08020	SEMS BOLT	M8*L20	
B16	MA0I06035	H/S ALLEN BOLT	M6*L35, TAP25	
B17	MA0M06016	TRUSS CROSS BOLT	M6*L16	
B18	MA0A06015	ALLEN BOLT	M6*L15	
B19	MA0V06010	SET SCREW	M6*L10	
B20	MA0W05016	TRUSS SCREW	M5*L16	
B21	MA0F05015	BUTTON CROSS BOLT	M5*L15	
B22	MA0Y04020	HEXAGON SPACER	M4*L20	
B23	MA1G04020	BUTTON SCREW	M4*L20	
B24	MA1G04018	BUTTON SCREW	M4*L18	
B25	MA1G04016	BUTTON SCREW	M4*L16	
B26	MA0F04015	BUTTON CROSS BOLT	M4*L15	
B27	MA1G04012	BUTTON SCREW	M4*L12	
B28	MA0F04012	BUTTON CROSS BOLT	M4*L12	
B29	MA0Y70103	HEXAGON SPACER	M4*L10	
B30	MA0F04008	BUTTON CROSS BOLT	M4*L8	
NO	**CODE**	**P/NAME**	**SPEC**	**Q'TY**

B31	MA0M04008	TRUSS CROSS BOLT	M4*L8	
B32	MA1G03016	BUTTON SCREW	M3*L16	
B33	MA1G03012	BUTTON SCREW	M3*L12	
B34	MA0F03008	BUTTON CROSS BOLT	M3*L8	
B35	MA1G03008	BUTTON SCREW	M3*L8	
B36	MA0L73008	SEMS BOLT	M3*L8	
B37	MA0Y03008	PILLOW CROSS BOLT	M3*L8	
B38	MA0K10020	HEX BOLT	M10*L20	
B39	MA1G04008	BUTTON SCREW	M4*L8	
W1	MA0S12000	PLAIN WASHER	M12x3t	
W2	MA0S10003	PLAIN WASHER	M10x3t	
W3	MA0Y40302	NECK WASHER	M8,D20,6t	
W4	MA0S06001	PLAIN WASHER	M6x1.5t	
W5	MA0U05000	TOOTH WASHER	M5	
W6	MA0U04000	TOOTH WASHER(INSIDE)	M4	
W7	MA0S03000	PLAIN WASHER	M3	
N1	MA0O12000	HEX LOCK NUT	M12	
N2	MA0O10000	HEX LOCK NUT	M10	
N3	MA0P10000	HEX NUT	M10	
N4	MAU113020	CASTER NUT	3/8”	
N5	MA0Y90103	SPEED NUT	M5	

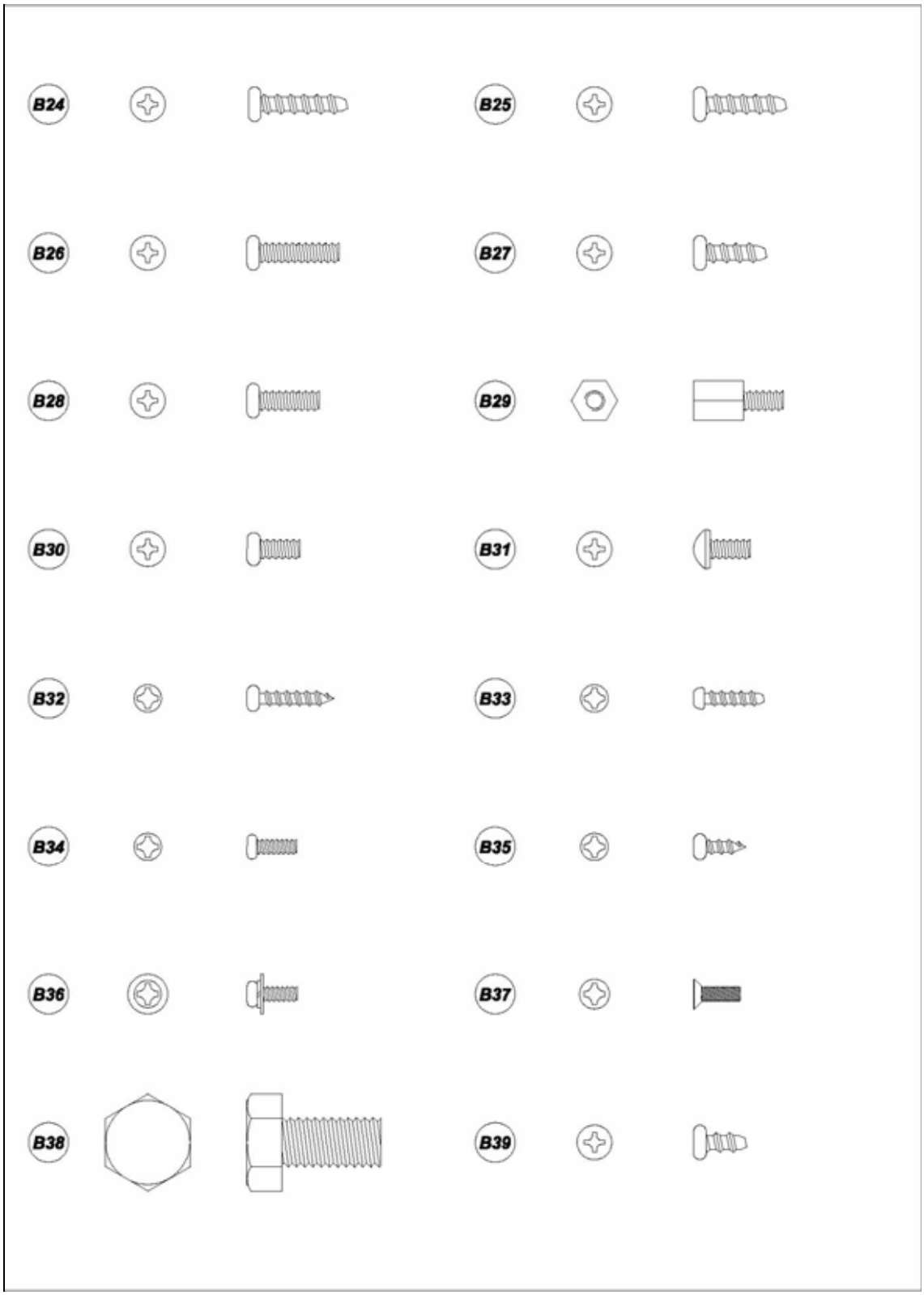
F.1 BOLT A



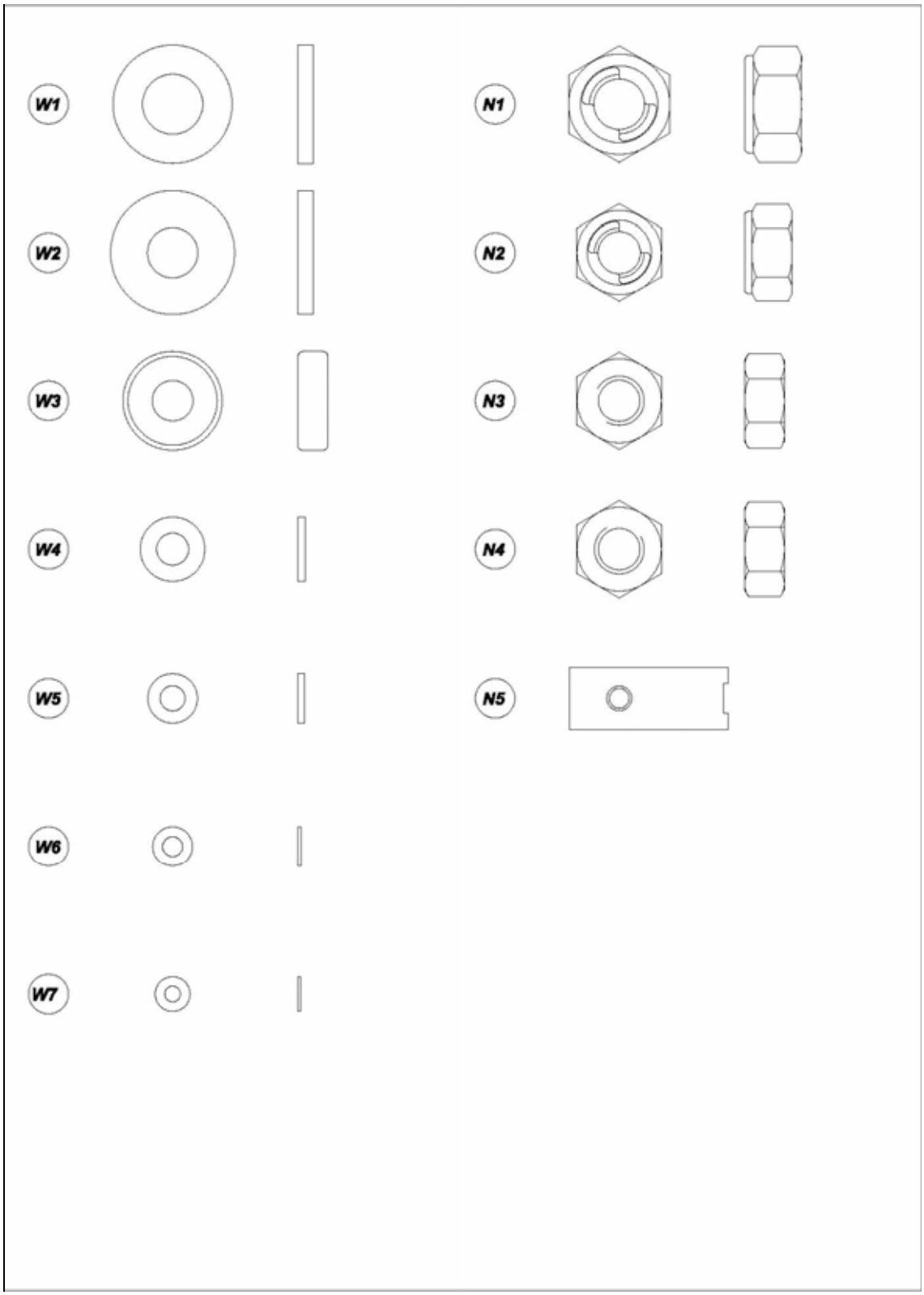
F.2 BOLT B



F.3 BOLT C



F.4 WASHER & NUT



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